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GAS JOURNAL

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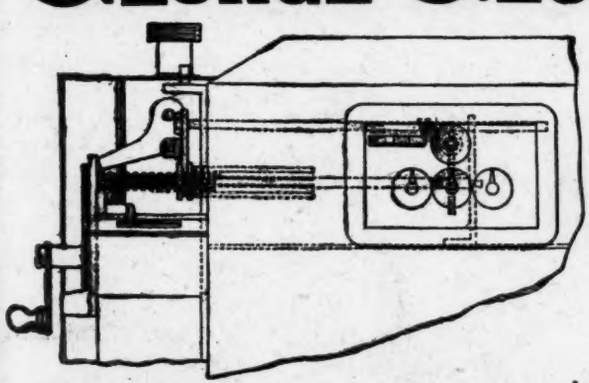

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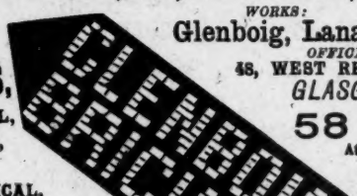

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VOL. CXLIII., No. 2882.] TUESDAY, AUGUST 6, 1918. [70TH YEAR.

EDITORIAL NOTES.

The Relief Bill in the Lords.

NEVER have gas consumers in London or elsewhere in the country had such sympathy showered upon them as they have had lately, particularly in the Legislative Chambers at Westminster; and never has gas capital had so little. The sympathy shown to consumers has been a magnificent exhibition. They cannot, however, live on sympathy alone; and they would have thought ever so much more of the House of Commons and the House of Lords if they had bestirred themselves actively and effectively to keep down the prices of coal, labour, shipping, and other necessaries of life, instead of allowing them to soar to their present heights—accounting for the existing price of gas. Successful intervention on the part of the Government in the directions specified would have enabled gas to be sold cheaper. The London County Council calculate that the gas consumers of the Metropolis are already paying for gas four millions a year in excess of that paid before the war. The London Gas Companies regret this; but they cannot help it. It is no fault of theirs. The Council omit to state what the coal consumers of London are paying more than before the war for their coal, and that under the Fuel and Lighting Rationing Scheme there is no compulsion to use gas in place of coal. The Council also point out that the concession made, from one-half to three-quarters of the standard rate of dividend as a minimum, will mean on the capital employed in supplying London with gas £289,460 more per annum to gas consumers. However true this may be, and however much the gas companies regret it, if they are not going to allow their capital to become ruined, they cannot help it. When the Bill was up for its second reading in the House of Lords, the Marquis of Crewe voiced the figures to which the County Council had given birth, as already quoted; but we really think the noble Marquis had not investigated for himself what the figures actually meant. He does not seem to appreciate that they are due to the magnitude of business, and that the base over which they are spread is one of considerable area. The figure which he mentioned as representing the difference between the half standard rate of dividend and the three-quarters, when divided by the 1,326,982 consumers large and small on the books of the three Companies at the end of last year, works out to 4s. 4·3d. per annum per consumer—that is to say, 1d. a week per consumer! That is the price to be paid for not permitting serious injustice to gas capital to continue. The Marquis of Crewe had evidently been insufficiently instructed. There were also remarks made in the Lords as in the Commons as to the Government, and not the gas consumers, providing the relief for gas capital, if relief were deserved. Gas stock and share holders would not object to this, if the Government would kindly offer to bear the burden. But despite all the acknowledgment in words which the gas industry receives for its work in providing necessaries for carrying on the war, the Government do not show any sign of a material acknowledgment. Another point is that there is something dangerous—this from Lord Parmoor—in placing yet another phase of national life under the control of a Government Department. We see something more dangerous in allowing the capital of an industry of such national importance as the gas industry to rush down the precipitous hill formed by war conditions and to meet destruction at the bottom. The fact of the matter is that the position is such a peculiar one that there are members of both the House of Lords and the House of Commons who fail to grasp it intelligently. However, the Bill was read a second time; and, on reaching the Committee stage last Friday, an attempt was made to restore the "one-half" rate. But ignominious failure resulted, as the proposal found acceptance by three peers only; and the Bill passed without amendment.

Liquid Fuel from the Gas Industry, and Other Matters.

THE Committee appointed by the Ministry of Munitions, over which Lord Crewe presided, to consider the question of producing fuel oil from home sources have presented a crushing report upon that made by the Petroleum Research Department, and have confirmed the decisions as to the correct lines of action of the Ministry of Munitions Mineral Oil Production Department. Where the Petroleum Research Department disastrously failed was in proposing the impracticable upon premisses which have no existence in the present. We can only imagine that the report of the Petroleum Research Department was largely based upon the evidence of parties interested in processes without adequate investigation to test the truth and practicability of their assertions. The low-temperature system of carbonization may have in the future of the country's work a very valuable place unless developments in other directions show that the same ends can be served in a manner that is finally more economical. But whatever results may be possible with a well-designed system of low-temperature carbonization given favourable conditions, they cannot be realized if the conditions are unfavourable; and the conditions are immensely unfavourable to low-temperature work at the present time.

For instance, as will be seen from the report by Lord Crewe's Committee [p. 258], the Petroleum Research Department calculated that some 12,700 tons of cannel and kindred material were daily made available for carbonization. But authoritative evidence laid before Lord Crewe's Committee indicates that not one-sixth part of this quantity could in these times be secured; that there is not the labour at hand to sort cannel from coal; and that to set miners specially to work on cannel would cause a further reduction in the output of coal. Why was not all this found out by the Petroleum Research Department? Had action been taken on the faith of their report, a considerable amount of money would have been expended; and it would all have ended in a fiasco. The Petroleum Research Department's report proposed the erection of first 98 batteries, which was subsequently increased to 127 batteries, of low-temperature retorts. Whence the labour, materials, skilled supervision, and all the rest were to be obtained not only for erection, but subsequent working, were secondary and neglected considerations. The fact, too, that there is a difference between a well-nursed and well-tuned-up experimental retort and ordinary operation with extensive plants by working men, was the subject of oversight. As to the cost, a battery of only thirty retorts to carbonize 50 tons of cannel per day (which is being constructed at Nottingham, so that the results may be compared with those from gas-works continuous verticals) is running into an estimated expenditure of £25,000; and, upon this basis, to carry out the recommendations of the Petroleum Research Department, an expenditure of several million pounds would be needed. From every standpoint, therefore—industrial, time, and expenditure—the Committee who advocated this line of work to supplement the fuel-oil

supply of the country failed in their appreciation of practical considerations.

The alternative is the utilization of continuous vertical retorts at gas-works, which can be adapted for cannel carbonization with a modicum of expenditure, and with all the advantages existent in gas-works in supervising labour, and the immediate disposal of the products not required for national purposes. Readers have full information as to what has been accomplished in this connection; and they will be interested in the comments made in the report, together with the references to official tests with the oil produced. At the same time, under present conditions—conditions that affect the supply of cannel—while the contribution of oil from vertical retorts will, of course, be valuable, there is not much prospect, with the curtailment inflicted by the times, of gaining quantitatively from this source in any considerable manner. Thus, in the opinion of Lord Crewe's Committee, it is not advisable to take any special steps for oil production from cannel or kindred substances in vertical retorts beyond those already adopted or in preparation. But within these limits, the process should be developed to the utmost.

There are, of course, objections to utilizing in gas-works cannel other than as an expedient for temporarily increasing the output of oil—objections affecting the additional cost of handling, and reduction in the output of coke suitable for industrial and domestic purposes. But among the Committee's recommendations as to oil developments in this country, points are made which have a material bearing on the future of the gas industry, and should be included in any scheme which defines the future lines of policy of the industry. In this connection, it is interesting to remark that, on the invitation of the Committee, Sir George Beilby, acted as their Technical Adviser, and so no doubt assisted them largely, after hearing expert evidence, to get the question into proper perspective. In the result, it is seen that the future extension of the gas industry will depend in a very considerable measure upon how much it proves its capacity for taking a still greater share in the work of the country, or else of being elbowed-out of new work by fresh comers.

Passing for awhile over the suggestion of the Committee that boring exploration should be made to ascertain whether or not the country possesses potentialities in respect of the yield of natural oil, advice is tendered as to the further development of the shale-oil industry; also as to the utilization of dehydrated tar by the employment of suitable solvents. By the way, in this connection, we have not heard anything lately about the award that was offered for a scheme which would enable dehydrated tar to be utilized as liquid fuel for Admiralty purposes. But the largest certain source of oil production that the Committee can find would be supplied by the transfer of raw coal from industrial and domestic purposes to retorts for a preliminary carbonization. The Committee do not specifically say that this should be done in gas-works retorts; but it is at this point that the gas industry must be prepared, by active intervention, to protect its territory for development. From every 20 million tons of coal carbonized, the Committee point out, from 1 to 1¼ million tons of fuel oil may be obtained. The gas industry is at present carbonizing its first 20 million tons of coal per annum. The true economic interests of the country suggest that the sooner it carbonizes a second 20 million tons, the better. The Board of Fuel Research are now developing a comprehensive inquiry into the technical and economic possibilities of a revolution in the preparation and use of fuel for industrial and domestic purposes. What, at the same time, is the gas industry doing most seriously? Waiting to see what turns up before making any substantial move on its own account? Everywhere we turn support is found for the plea that the President of the Board of Trade should appoint a Special Committee to investigate the position of the gas industry, with the view to framing a complete scheme of policy which will serve, through the industry, the economic interests of the country.

Electricity Ration and Coal Consumption.

Hard upon the issue of the Fuel and Lighting Rationing Order, there comes from the Coal Controller (Sir Guy Calthrop) an indirect admission that he has made a huge mistake in allocating 800 units of electricity for heating as the equivalent of a ton of coal. We wish to emphasize the word "indirect," because the confession is derived from certain figures he has published as to the coal consumption at the electricity generating stations of the country. It is impossible to contemplate the figures without arriving at the conclusion that Sir Guy has either been grossly misled, or has, out of sheer pity or for some other reason, been lenient to electricity to a degree that constitutes an ugly injustice to his own economizing scheme, and to all people who utilize coal with greater economy than is done at the electricity generating stations. Returns have been obtained by the Department from all electricity stations in the country as to the coal consumption and the units generated; and it is found that the differences in consumption of coal per unit of electricity generated range between 2·026 lbs. for the best station and 17·93 lbs. for the worst one. All the other stations are packed in between these two widely separated figures. The stations throughout the country have been grouped into the areas as planned by the Coal Controller for his Coal Redistribution Scheme. The result of the compilation is given in "Electricity Supply Memoranda" for this week; and it is extremely interesting to look into the relation of the figures to the rationing allowance for heating (without taking into account the grant for lighting), bearing in mind at the same time that the 800 units per ton do not include transmission losses. The first thing observed is that out of twenty-one areas there are only two—Durham and Northumberland—in which the average consumption of coal at generating stations justifies the allotment of 800 units (to say nothing of the lighting units) by using under 2·8 lbs. of coal per unit—2·8 lbs. × 800 = 1 ton. These two areas consume 2·48 and 2·51 lbs. respectively per unit generated. As to the other areas, there are six consuming between 3 and 4 lbs. per unit; eight, between 4 and 5 lbs.; and three, between 5 and 6 lbs. One of the other two areas—Derby and Notts—has an average consumption of no less than 8·38 lbs.; and the final area—Shropshire—has the fearfully bloated average of 16·92 lbs. The average for the whole country is 3·44 lbs. But there are only half-a-dozen of the areas out of the total of twenty-one below this average; and, as we have pointed out, only two areas are under the 2·8 lbs. which is the maximum consumption there should be per unit to allow of 800 units to the ton. Therefore, in nineteen areas, the Coal Controller is largely out of pocket by his allowance. If we take 4 lbs. per unit (not generated, but sold) this would produce 560 units per ton, or 240 units below the 800 units allowed. Therefore, at 4 lbs. the Coal Controller is nearly half-a-ton out of pocket, and worse at the higher consumptions. At 5 lbs. per unit, 448 units is the equivalent of a ton of coal; at 6 lbs. per unit, 373·3 units; at 8·38 lbs. per unit, 267 units; and at 16·92 lbs. per unit, 132 units—not 800 units. Without reckoning the coal representing electrical transmission losses, 800 units at 4 lbs. per unit equals 1·43 tons; at 5 lbs. per unit, 1·79 tons; at 6 lbs. per unit. 2·14 tons; at 8·38 lbs. per unit, 3 tons; and at 16·92 lbs. per unit, 6·04 tons. These figures show that the Coal Controller has been badly hit by his generous rationing allowance in the case of electricity. In face of them, what is he going to do? Continue to allow more coal to be used in the generating-stations to produce 800 units than would be used in the domestic fireplace for heating? This is unfair to all consumers of coal and gas who are not electricity consumers; and it is unfair to consumers of coal who make better use of it. The Coal Controller must admit that he has made a peculiarly bad mistake. But why did he make it?

Protection of Official Engineers.

Times have changed in connection with municipal service, and in a manifold manner. The composition, for example, of municipal councils has been altered largely to the discomfort of officials—however well and wisely they discharge their functions. Another disadvantage from the gas point of view is that local authorities have so largely taken under their wings electricity supply; and everything possible is done to favour the younger enterprise to the detriment of the older one. The municipal gas engineer and manager has a difficulty in such circumstances to maintain business progress. Yet in England he is expected, whatever be the current circumstances, to conduct the concern so as not to lessen the output of profit, in order that the vicious system of contributing to the rates, after meeting all financial obligations, may not suffer. He also finds that his counsel to improve the technical and commercial position of the concern is often set aside on the ground of expense, while the same councillors will move heaven and earth to get new loans for the

electricity undertaking, even though it may not be financially highly productive, save perhaps in loss, which the ratepayers generally have to bear. We cannot understand the psychology of councillors who so act; but the facts are well matured and are strikingly obvious. At the same time, we must do as we have always done, acknowledge that there are some local authorities regarding whom the accusations would not hold good; but regretfully it has to be admitted they are not so plentiful as we should like to see. However, the conditions are largely responsible for the attempts that are made by officials, whenever opportunity offers, to migrate from municipal to company service.

There are gas engineers who have suffered, and are suffering, under the influences referred to who, in their irritation, consider that the Institution of Gas Engineers does not do enough for them in the way of protecting their interests. The Institution is not the proper body to do this. Its objects are primarily technical; and it is not a trade union. The same applies to the Institution of Electrical Engineers; but this body has taken a step with the object of meeting the difficulty, which can only be done by an organization constituted as a trade union. It seems a bit undignified for professional men to be placed in a position which calls for anything having the nature or objects of a trade union. But if there is no other course open to obtain protection, and there is anything against which they require defence, then the means justify the end. The electrical engineering industry have organizations with objects which are not, and cannot very well be, covered by the Institution of Electrical Engineers, large as is its membership; and so the scheme that is now in hand is to amalgamate these various external organizations upon the foundation provided by one of them —the "Electrical Power Engineers' Association," which is constituted as a trade union. The primary purpose is the protection of trained electrical engineers generally who are members. It is considered, too, that the Whitley report has made such an organization imperative if electrical engineers are to have a voice and exercise power in the settlement of questions that arise between employers and employed. If this is necessary for electrical engineers, what about gas engineers? We call attention to the proposal; and there leave it. But it will be noted that electrical engineers are making provision along fresh lines for collective thinking, action, and power.

In every direction, electricity is getting ahead of the gas industry in the preparations it is making for the future. The gas industry has earned the reputation of being slow-moving. It seems loth to lose this character. Only a few days ago, a man who is interested in the industry—not as a gas engineer—in talking over the subject of certain recent articles in the "Journal," remarked that, so far as his observation led him to form a conclusion, there appeared to him, with few exceptions, to be a disposition in the gas industry not to take the present position and outlook seriously enough; and he could see no signs of push and activity in making preparations and taking precautionary measures for the future. That is the view of a business man with a considerable interest in the industry's prosperity. We do not want people to begin to lose faith in the industry; we do not want the impressions of this candid observer to gain ground. The best counteractive will be to take the course suggested in editorial articles that have lately appeared in our columns, beginning with June 25.

Labour Dilution in Retort-Houses.

Not any too soon in the year, though gas engineers and managers should not require the reminder, the Ministry of Munitions has urged them to look forward, and take the necessary steps to fill up the gaps in their works' labour requirements for next winter by the employment and training of women. Last winter in many gas-works, the position in regard to labour was critical; for much as the spirit was willing, the power of the Ministry was not sufficient to meet all the claims for reinforcements. In the coming winter, the labour question will be more acute than in any war-stormed winter that has preceded. It is bad management, in these days particularly, to wait for the arrival of the difficulty before beginning to seek means to discount it; and this applies particularly to work such as that in the retort-house, where a preliminary training is necessary for new hands, although, as the experience at the Vauxhall station of the South Metropolitan Gas Company (in which experience we have taken the keenest interest) has convinced us that preliminary training is not so long for women as at one time we should have estimated as necessary. Under suitable conditions, it is by the employment of women that the labour difficulty in retort-houses must be met, and particularly in houses equipped with horizontals, machine-worked.

Many gas engineers have objections. They have preconceived notions as to the unfitness of retort-house occupation for women. A cure for objection and misconception is provided at the Vauxhall works, where three out of the four retort-houses are operated by women, while the men are away on sterner work elsewhere. We gave a full description last January of what was seen at Vauxhall, and the impressions gained from a morning's visit there, when winter work was at full tide [see "Journal" for Jan. 22, p. 153). The best advice that can be given to doubters is that they should read this article, and then take a trip to Vauxhall and see for themselves. If there is any idea that preparations are made for such visits, then gas engineers and managers may go without making an appointment; for the Chairman of the South Metropolitan Gas Company (Mr. Charles Carpenter, D.Sc.) and his colleagues are so anxious to assist not only the Ministry of Munitions but the gas industry that they have given permission for a general announcement to be made that gas men may, without previous notice, call at the works, and have a free run round them, to witness the efficiency of employing women. There is nothing to hide, because the general working of the retort-houses by the women, not under superlative conditions, provides an object-lesson of the first order. The Company are proud of their retort-house women, who have come to them from all classes of employment, even from the refined one of dress-making; and the women themselves are proud of the fact that they are able to leave normal and more or less sedentary occupations, and do the more difficult work of men (quite as well as the "softer" jobs), and so help to keep the gas supply of London going, as well as the output of coke, explosives materials for helping the men at the front, and fertilizers for the fields. In retort-house work agility is valuable, and knack is indispensable. The women employed have the former; and they are quick to acquire the latter. The question of utilizing both disabled soldiers and sailors comes in. The gas industry desires to employ as many of them as possible, compatible with due efficiency. Whether or not there are those among them capable of performing retort-house work depends on the nature of the disablement. But, generally speaking, the disablement is unfortunately of such a character that they would not be the equal in the characteristics that have contributed to the making of the Vauxhall retort-house women the success that they have been.

We know that with some gas managers there is fear as to the attitude of the men on the works towards such an innovation as the employment of women in retort-houses. The patriotism of the men should alone be sufficient to secure a change that assists to meet the country's need. From the beginning of the war in every direction of work there has been this fear; but it has progressively vanished with the sure inroads that women have made into industrial and commercial work to supply the deficiency of men. The first strangeness of seeing women in new occupations has worn off; and their and our sense of modesty is not shocked by overalls. Necessity has compelled a change of view; and it has shown us, in practical manner, how silly and how narrow custom had made us. We are wiser to-day; and public opinion, as recent experience from munition centres has shown, is dead-set against people who will not allow the productive power of the country—whether men, women, or machines—to be used in the most efficient manner. This applies not only to workmen, but to gas engineers and mant agers. The latter must, to please public opinion, do theishare in using man and woman power in the most efficienr manner. Anyway, the Labour Department of the Ministry of Munitions will not entertain any question of relief for them unless they can prove that *bonâ fide* endeavours have been made to obtain and utilize the work of women in every direction in which their capability has been proved.

Destruction of Stability.

Printing exigencies in view of Bank Holiday compel us to defer until next week comment on the half-yearly report and accounts of the South Metropolitan Gas Company. They are

however, reproduced on other pages. The report will be read with more than ordinary interest. Underlying its words, one detects the righteous indignation of the Chairman (Mr. Charles Carpenter, D.Sc.) over some of the causes that have contributed to the reduction of the Company's financial position to what it is to-day—a Company that has for long held the reputation among investors of being a model one for stability. To-day there is no certainty in the conditions enveloping it or other gas undertakings. Freedom of management has been completely destroyed; and Government control holds sway everywhere. The industry is the willing, but compulsory, servant of the Government. The Government show their appreciation by allowing such a descent in reward to be made as is shown by this report, and then grudgingly places at a low level the point at which descent shall cease. The position is one that is not due in a single particular to gas stock and share holders; but they are the victims, and individually the heaviest sufferers. Consider a few sentences from the South Metropolitan Company's report: "The half-year's dividend upon the Company's ordinary stock amounted to £175,750 before the war. To-day it is £105,758. The price of gas before the war was 2s. 2d. per 1000 c.ft. To-day it is 4s." The dividend is at the rate of £3 4s. to-day; in the current half-year it will be under 2½ p.ct. There was good service by the Company before the war; there is good and increased service now, but under heavy conditions which, if anything, should mean greater reward, not less. There is every reason for showing some feeling over the position.

Diminishing Coal Stocks.

There is reason for regarding with some dismay the declining coal stocks at gas-works down South. A couple of accounts of gas companies for the past half year happen to be lying on our writing-pad; and reference shows that these two companies alone record a difference of 34,982 tons in stock at the end of June compared with June last year. It is not the difference in the case of one undertaking that matters; it is the shortness of the aggregate that is the point for concern, because this makes more remote the chances of any individual works reinforcing its stocks. These chances, too, are further reduced by railway conditions. Just recently further wagons and locomotives have been sent over to the Continent; and so the capacity for dealing with goods traffic at home has been further diminished.

The Half-Year's Accounts and Gas Rationing.

A point of interest in connection with the past half-year's gas accounts would be, if it were possible, to ascertain how far the first rationing scheme, which demanded from consumers a one-sixth reduction of consumption, affected the total sales. But whatever the character of the change in consumption, whether it be an increase or a decrease, it would not be safe to say that the consumers in any particular district had not made an effort to comply with the behests of the Coal Controller and the Board of Trade, because so many other factors come in to disturb the sum of the output. Munitions requirements and atmospheric conditions command considerable differences in consumption. The only way to test the matter—though there would not be any great certainty about it—would be to compare the meter registrations; but then, if a general reduction in domestic use was observable, it would be doubtful whether this was due to a genial compliance with mandate or to the convenient lightness and mildness in atmospheric conditions. Perhaps in view of the old rationing order having been superseded, gas company chairmen will not be disposed to say much at the forthcoming half-yearly meetings as to whether their private consumers showed any disposition to economize owing to the first and now defunct Order.

Petroleum Technologists and Fuel Oil.

Remonstrance against what is believed to be the apathy of the Government in the matter of the supply of fuel oils comes from a Committee of the Institution of Petroleum Technologists, appointed to investigate and report upon the production of oil from cannel and allied materials. So far as we can see from a summary of their interim report, the Committee have not been able to carry out the terms of their reference; and so they do the next best thing—attack the Government under a mistaken notion that those in authority have not been looking into the possibilities of doing something, under existing conditions. The Committee regard with apprehension the situation as to the supply of fuel oil and motor spirit, and the long delay in taking action to develop home supplies. They also strongly urge the Government to afford all necessary facilities to those who are prepared to find the capital for, and take the risk of, the erection at suitable centres of plant for the treatment on a commercial basis of the material known to exist. The Government cannot afford to allow money to be squandered without being thoroughly satisfied that the venture will be a profitable one. It is therefore for those who are prepared to risk the capital to prove their case, which in the present position of supplies of cannel, labour, materials, and so forth appears to be an impossibility. The Government did extend their help to a private venture somewhere in the neighbourhood of Barnsley; but they have regretted it ever since. The Committee also suggest that the War Cabinet should be invited to lay down a definite policy for the guidance of the Departments as to the relative value and importance at the present time of oil and coal, the provision of labour, raw material, and transport. The Departments have investigated these matters. They are fully alive as to the importance of oil; and they are profoundly impressed by the fact that labour, raw material, and transport are redoubtable checks (even if other conditions favoured) to developments in the direction indicated. One other suggestion is that an experimental station should be established forthwith for the testing of retorts, and that the station should be either maintained at the expense of the Government or the Government should afford all necessary and reasonable facilities for its erection. What is the matter with the East Greenwich Research Station which the Fuel Research Board are erecting? There is no need for a multiplication of such stations. Moreover, the Government Departments have tested experimental plants put up on what the owners themselves consider to be the highest pitch of perfection—this applies not only to low but to high temperature and graduated temperature installations. Nothing more within reason could possibly be done.

Fuel and Lighting Rationing Order in the House.

The Government are going to adhere to the Fuel and Lighting Rationing Order; and they hold out no better hopes as to coal supplies next winter. But such as their hopes are, it is questionable if they will be fulfilled as things are shaping. The two first points stare at us out of the discussion which took place in the House on Wednesday, and the last one out of current practical experience. It must be taken that Sir R. Walton (who raised the discussion) knows—representing Barnsley in Parliament—something about the question of coal supplies; and he says that, if the collieries could work full time, there would be no shortage of coal, and no need for the Rationing Order, which means that next winter the householders of the country will be half-starved for fuel. Sir Albert Stanley admitted that the amount of fuel available for next winter would be 25 p.ct. less than the allowance for last winter. In Sir R. Walton's opinion, if the Coal Controller devoted his attention to increased production rather than to decreased consumption, he would be acting more in the interests of the country. There is something more than this required from Government. While there is knowledge that the military situation has made a considerable difference to the question of coal supplies at home and abroad, we are not convinced that the best is being done at home. There is something wrong here. What is it? And how can it best be attacked? There is the question of the low output efficiency from the pits. But there is also the question of the poor transit facilities; and this is a matter that should be attacked very energetically. And who could take it in hand better than the Coal Controller through his intimate knowledge of railway affairs. The question of railway transit is a fundamental weakness.

An Appeal to Drop or Defer the Rationing Order.

An appeal was made to the President of the Board of Trade by Sir Daniel F. Goddard to drop the Rationing Order altogether, or at any rate postpone its enforcement until October. But Sir Albert Stanley could not see his way to comply to the one suggestion or to the other. But whatever the President of the Board of Trade or the Coal Controller rules, we are afraid that the threatened chaos of next winter will be enormously intensified by the fact that the vast machinery for putting the Order into operation and carrying it out is still incomplete, and now we are in the second

month of the official time for bringing the Order into force. We do not know of a single householder who has yet been instructed as to what he has to do to comply with the Order in respect of coal, gas, and electricity, except through the newspapers; and a pretty mess some of these have made of the information they have given. The longer proper instruction is deferred, the greater the confusion; for many householders have unpatriotically taken advantage of the delay to get their coal-cellars well stocked, and coal merchants have acted as accomplices. The great majority of householders do not understand what is expected of them, nor how to carry out the Order; and they never will do so, so far as we can see. The Coal Controller and his staff have overlooked the fact that their own intelligence does not represent the normal average.

Supply Prospects, and Rationing Industries by Priority.

Both these are subjects which concern the gas industry. The prospects are not great; but the gas industry must see to its proper place in priority, aided by the Ministry of Munitions. There need be no deficit in output if the miners were not the actual controllers. But as things are, there is a deficit, taking into account the new military situation which has deprived France so considerably of its own sources of supply, and made Italy more than ever dependent upon this country. The improved shipping position, it is expected, will enable our coal areas producing for export to yield 10 million tons more. There are stored at the pits 4 million tons; and 3 million tons are stored at consumers' depôts. Provision has been made for the return from the Army of 25,000 miners of low medical category; and these, with the usual influx of boys, will give an additional 3½ million tons. From these four sources will be secured roundly about 20½ million tons of coal, which will leave a deficit of 15 million tons. The Fuel Order is estimated to save 8 million tons; and rationing industries by priority 7 million tons. This is the position; and Sir Albert Stanley here made remarks which should be particularly noted by the gas industry. Essential industries, he said, engaged on work of national importance must be guaranteed an adequate supply of coal; and the less essential industries which are not engaged directly on war work will be subjected to a priority system, so as to secure a saving of 7 million tons of coal. The question of priority will be decided by a Committee composed of representatives of all departments of the Government which might be affected. The gas industry must keep track of the proceedings under this priority rationing.

PERSONAL.

Mr. HAROLD DAVIES, Gas Engineer at Brighouse, has been appointed Local Fuel Overseer, under the Fuel and Lighting Order, at a salary of £144 per annum.

Mr. CHARLES WOOD, the Engineer and Manager of the Bradford Gas Department, has been appointed an honorary adviser on gas rationing for the Yorkshire area, under the Fuel and Lighting Order.

Mr. A. EDWARDS, Chief Chemist to the Leeds Corporation Gas Department, has resigned, to take up a similar post at the Beckton works of the Gas Light and Coke Company. Mr. Edwards is one of the best-known members of the Yorkshire Junior Gas Association, and has special knowledge of gas chemistry which has enabled him to give the members some important papers.

The vacancy at Southend (which arose in consequence of the removal of Mr. C. S. Shapley to Leeds) has been filled by the appointment as Engineer and Manager to the Gas Company of Mr. THOMAS F. CANNING, a son of Mr. Thomas Canning, of Newport (Mon.). Mr. Canning has since the beginning of 1915 been Engineer and Manager to the Weymouth Consumers' Gas Company, previous to which he spent seven years as Assistant Engineer and Manager to the Ilford Gas Company.

In connection with the award to Mr. E. W. SMITH of the degree of Doctor of Science of Manchester University, the members of the chemical staff of the Birmingham Corporation Gas Department presented him with a smoker's cabinet and case of pipes—the cabinet bearing a tablet suitably inscribed. The presentation was made by Mr. W. A. Twine (Chemical Plant Superintendent), who referred to the very high esteem in which Mr. Smith is held by all the members of his staff, and the cordial relations which existed between them. In returning thanks, Mr. Smith said he was proud of his staff and of their loyalty and the good feeling which prevailed among them.

Last Wednesday evening Mr. SYDNEY R. BARRETT, who recently retired from the position of Fittings Superintendent to the Birmingham Gas Department, was the recipient of a handsome present from the staff, in the form of a mahogany roll-top desk, suitably inscribed silver candelabra, and a pair of silver candlesticks. A social gathering, held at the White Horse Hotel, was presided over by Alderman J. H. Lloyd (in the absence of Alderman Sir Hallewell Rogers, the Chairman of the Gas Committee). Alderman Lloyd, in making the presentation, said the fund had been subscribed to by 440 members of the staff, as well as by a number of former members. They hoped the gifts would be of use to Mr. Barrett for many years. They were evidence of goodwill, and testified to the cordial relations which existed in the department. Many changes had taken place during Mr. Barrett's long period of service. Thirty years ago, there was not a single slot-meter in Birmingham; whereas to-day they exceeded 100,000. Mr. Barrett took a very active part in popularizing the system. Captain R. S. Hilton spoke in support of the presentation, and of the great value of Mr. Barrett's work. Mr. Barrett had left his mark on the department; and his influence and work would be felt for a very long time. Mr. A. W. Smith (the Secretary of the department) also spoke with warm appreciation of Mr. Barrett as a conscientious worker, and a good friend. His popularity was shown in the general desire to be associated with the testimonial. The Gas Committee, principally on Mr. Barrett's recommendation, and backed by Captain Hilton, had appointed Mr. R. J. ROGERS as Fittings Superintendent, Mr. R. G. MARSH as Fittings Engineer, and Mr. G. M. LEWIS as Show-Room Manager at Birmingham, Sutton Coldfield, and King's Norton. Mr. Barrett would remain in a consultative capacity for three years. Many other speakers paid tribute to Mr. Barrett's services. Mr. Barrett, in acknowledgment of the gifts, said he valued them because they were real evidence of friendship. He had always striven to maintain cordial relations in the department. It was good for all interests; and administrative life was made the pleasanter.

OBITUARY.

It is with regret that we have to chronicle the death of Mr. JOHN P. FENTIMAN, who passed away at his residence at New Malden, Surrey, on Monday of last week, after an operation for abscess on the lung which was successfully performed the previous day. The deceased was in his 52nd year, and had represented Messrs. Fletcher, Russell, & Co. for the long period of thirty-three years. Interment took place at Kingston-on-Thames Cemetery on Thursday last. Among those who attended were Mr. Charles Clare, the Managing Director of Messrs. Fletcher, Russell, & Co., with Mr. Drane and Mr. Wilkins, representatives of the firm. Mr. Fentiman leaves a widow and one son.

NATIONAL GAS COUNCIL.

Executive Committee's Meeting.

A MEETING of the Executive Committee of the National Gas Council was held on Tuesday last, the 30th ult.

It was reported that the second reading in the House of Lords of the Statutory Undertakings (Temporary Increase of Charges) Bill had taken place, and that the Committee Stage would be reached on Friday, Aug. 2, when a motion would be put for the reinsertion of the word "half" in substitution for "three-quarters"—*i.e.*, to reverse the amendment made by the House of Commons in proviso (*b*) of clause 1 (1) of the Bill. This matter was receiving the earnest attention of the Council.

Discussion took place in connection with the serious effect upon the consumption of gas which it is feared will result from the Household Fuel and Lighting Order, 1918, and the consequent decrease in the production of benzene, toluene, fuel oils, and other tar products, so urgently needed by the Government at the present time. Further in this connection, the serious shortage of coal stocks was referred to; and a resolution was passed to the effect that the attention of the Government should be drawn to the dangerously low stocks of coal at gas-works throughout the country, and to the insufficiency of the supplies of coal now coming in, and the consequent prospect of failure of the gas supply of the country in the coming winter which would have a gravely prejudicial effect on the output of high explosives, fuel oils, and other essential materials. It was resolved that the Government be requested to make immediate inquiry into the causes of the shortage, and take steps to alleviate the situation.

It was felt that, in forwarding this resolution, a letter should be sent suggesting that the Government should temporarily suspend the Miners' Eight-Hours Act, and should depute speakers to appeal to the patriotism of the miners—setting out the facts of what this country is doing to supply coal to the Allies, showing the serious consequences of a restricted output, and urging the miners to work longer hours and a greater number of days per week, in order to raise increased quantities of coal.

With regard to a request of the Ministry of Munitions that gas undertakings should extend the employment of female labour in the carbonizing departments, it was decided to consult further with the Ministry on the matter.

A letter from the Gas Companies' Protection Association, nominating Mr. R. W. Edwards as a member of the Executive Committee, was reported.

Arrangement with Distillers for the Sale and Purchase of Tar.

A Joint Committee of Tar Producers and Distillers was held in London last Thursday, when the scheme which had previously

been approved by the Committee was again considered, and the views of certain of the Commercial Sections of the District Gas Associations and Institutions were reported. It was decided to report the matter to the Association of Tar Distillers and the National Gas Council; and in the meantime arrangements are being made to hold meetings of members of the various Gas Associations and Institutions at four centres—namely, London, Birmingham, Bristol, and Leeds—when the details of the scheme will be explained and questions answered. The scheme is expected to be submitted to the National Gas Council on the 22nd of October; and, on receiving their approval, it will be placed before the industry.

Labour Questions.

A Meeting of the Committee of the National Gas Council appointed to deal with labour matters was held on Tuesday last, the 30th ult.

The Chairman (Mr. D. Milne Watson) referred to a letter received from the Ministry of Labour, in which it was suggested that a Joint Conference should be held with representatives of the various trade unions connected with the gas industry on the question of forming a Joint Industrial Council for the gas industry on the lines of the Whitley reports.

After discussion, it was thought desirable that this should be referred to the Council and to the gas industry, and that consideration should be given to the possible development of the Council with the object of making it more representative.

SOCIETY OF BRITISH GAS INDUSTRIES PRIZE COMPETITION.

In his Presidential Address to the Society of British Gas Industries last April, Sir Robert A. Hadfield, Bart., F.R.S., it will be remembered, made a generous offer of a prize of £150 to be competed for. It has now been arranged that the amount named shall be divided into a first prize of £100 and a second prize of £50; and the general conditions of the competition have been printed on posters, for display in the factories concerned.

The competition is open to all the employees of firms who are members of the Society. The subject may be a description (accompanied by drawings if necessary) of an invention for improvements in plant, apparatus, or machinery connected with any of the twelve sections of the Society's industries, or, alternatively, an essay or paper giving practical suggestions in the improved laying-out of, or utilization of, plant or apparatus such as is supplied in connection with any of the sections named. All inventions or essays will come before the Council of the Society, who will make a selection, and then submit them to the President and Vice-Presidents for their approval; so that every possible effort shall be made to arrive at just awards. They will be treated as confidential; and any invention of a patentable nature will be considered the property of the competitor. No communication will be published without the entire concurrence of the competitor. The Council have full discretion as to the awards; and there is no liability on their part to grant the full sums, or any portion of them, unless in their opinion the inventions or essays submitted should be of such excellence as to merit an award.

Competitions must not be signed with the full name of the competitor, but under a *nom de plume*. An accompanying letter must bear his full name and address, together with a letter from his employers certifying that he is in their employment, and that the communication has their sanction. These letters will be in the hands of the Secretary, and will not be disclosed until after the adjudication of the awards. The inventions or essays should be deposited with the Secretary, Mr. Arthur L. Griffith, No. 46, Queen Victoria Street, E.C. 4; and the latest day for receiving competitions will be Jan. 31, 1919. The envelope should be marked "Competition."

South Metropolitan Women War Workers.—Reproducing a photograph of Miss R. Stubbington, who has been appointed to succeed Mrs. Armstrong as Lady Superintendent, the South Metropolitan Gas Company's "Co-Partnership Journal" says: The work of women in the service of the Company has become known all over the land; and engineers from far and near have visited our works to see what can be achieved by female labour. Most of these visits have been made to Vauxhall, where women are engaged in almost every capacity—including carbonizing, the unloading of coal-barges, purifying, coke loading, &c. At first women were taken on by the Company for very light work—such as index-reading, burner maintenance, and office work—but now the activities of the female staff (which varies from 2000 in the winter to 1600 in summer) include many chemical and mechanical processes—carpentry, bricklaying, oxy-acetylene welding, and slot-meter repairing and adjusting. About 400 women clerks are in the Company's offices and show-rooms; and much work in the chemical laboratories is done by women who are graduates in science. The work of the Lady Superintendent has increased in responsibility since March, 1916, when the number of women employees was about one-tenth of what it now is.

SOUTH METROPOLITAN GAS COMPANY.

Half-Yearly Report and Accounts.

The following is the report of the Directors of the South Metropolitan Gas Company for the six months ended the 30th of June, which will be presented to the proprietors at the half-yearly meeting on the 14th inst.

In the last report it was pointed out that the increase in the price of gas by 6d. per 1000 c.ft. did not allow any margin of working; and, as a result of additional official restrictions in the use of gas, it has proved insufficient. It will consequently be necessary to draw from the reserve fund a further sum of £23,303, in order to pay the statutory sliding-scale dividend at the rate of £3 4s. p.ct. per annum on the ordinary stock. The price of gas has now been raised to 4s. per 1000 c.ft., and a further increase will have to be made next Michaelmas—to what extent depends mainly upon the effect of the proposals of the Coal Controller for reducing gas consumption, and upon how long the present rates for coal and labour remain unaltered. The only certainty is that the dividend payable under the sliding scale for the current half year will be under 2½ p.ct. per annum upon the ordinary stock.

Nothing could more clearly demonstrate the unfairness of the present sliding scale to the conditions which exist to-day after four years of war. It was fixed forty-two years ago, to reward good management and to impose a fine upon bad management by making additions to, or deductions from, a standard or basic dividend, which has been fixed for this Company at 4 p.ct. per annum. The relief proposed by the Government Bill lately read for the third time in the House of Commons, and by which a dividend of 3 p.ct. per annum may be paid on the ordinary stock as compared with the pre-war figure of 5½ p.ct. is a meagre recognition of the important help the Company has given (in common with other gas undertakings) in the production of munitions of war, and compares unfavourably with that accorded to most other industries.

The Bill by which it is proposed to increase the capital powers (now exhausted) of the Company by the sum of £1,350,000 has passed unopposed through the Committee stage of the House of Commons—the clauses modifying the sliding-scale basis having been struck out by an instruction of the House.

As regards working results for the half year, these are so much beyond the control of the management that comparison with previous figures would be of little value. It may be well, however, to record the following facts: The half-year's dividend upon the Company's ordinary stock amounted to £175,750 before the war; to-day it is £105,758. The price of gas before the war 2s. 2d. per 1000 c.ft.; to-day it is 4s. This increase is due mainly to the higher cost of coal, and to advances in wages paid by the Company. In this connection it should be stated that, in spite of their desire to keep wages from rising to a figure which they feared would cause injury to the business, the Employees' Committee have at last felt compelled to recommend that the 12½ p.ct. addition to wages should be paid, as is now the general practice.

July 31, 1918. CHARLES CARPENTER, *Chairman.*

The Accounts.

The following are the principal portions of the accounts accompanying the report.

The first two statements relate, as usual, to the stock and loan capital. The former sets forth that the standard rate of 4 p.ct. is payable on £6,011,224 and £598,671 (Act of 1901, as amended by the Act of 1916) of stock. The amount of 5 p.ct. preference stock (including premiums) under the 1916 Act is £250,000. The loan capital account shows that the loan capital, the rate of interest on which is 3 p.ct., amounts to £1,798,994 and £96,451 (Act of 1901, as amended by the Act of 1916). The amount, at 5 p.ct., under the Act of 1916 is £500,000. The third statement is the capital account. It stands as follows: Amount received, £6,211,816; nominal amount added by conversion (less premium), £3,043,524—total, £9,255,340. The items of expenditure are as follows:

Capital account to Dec. 31, 1917		£5,493,626 12 6
Expenditure during half year to June 30, 1918—viz.:		
New buildings and machinery	£7,470 15 11	
New and additional mains and services	2,274 5 8	
		9,745 1 7
Total expenditure		£5,503,371 14 1
Balance		708,444 12 2
		£6,211,816 6 3
Nominal amount added by conversion, less premium		3,043,523 13 9
Total		£9,255,340 0 0

The net revenue account shows a sum of £88,704 applicable to dividend on the ordinary stock. The balances of the reserve, renewal, and insurance funds stood as follows on June 30 last: Reserve fund, £146,750; renewal fund, £30,762; insurance fund, £83,075.

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, £114,564; coke and breeze, £73,921; tar, ammonia, and products, £176,796; and sundry plant and stores, £319,589.

The following is the revenue account of the South Metropolitan Gas Company for the half year to June.

REVENUE ACCOUNT—*Expenditure.*

Manufacture of gas—		
Coal into store, including £3135 3s. 10d. or London Port and tonnage dues	£996,616 11 7	
Purification	23,296 17 3	
Salaries of Engineer and Officers at works	24,298 15 6	
Wages (carbonizing)	86,577 11 5	
Repairs and maintenance of works and plant, less £4395 18s. 3d. received for old materials	226,530 14 10	
		£1,357,320 10 7
Co-partnership		..
Distribution of gas—		
Repair, maintenance, and renewal of mains and service-pipes	£39,791 1	
Salaries and wages of officers, including rental clerks	31,428 11 11	
Repair and renewals of meters	31,320 11 6	
Repair and renewals of stoves	28,387 14 8	
Repair and renewals of gas-fittings	29,214 15 8	
		160,142 15 6
Public lamps, labour and materials £20,976 18s. 7d., less £13,574 18s. 3d. received for the same		7,402 0 4
Rents, rates, and taxes—		
Rents payable	£1,020 6 6	
Rates and taxes	73,805 7 5	
		74,825 13 11
Management—		
Directors' allowance	£2,852 7 6	
Salaries of Secretary, Accountant, and clerks	6,352 17 5	
Collectors { Ordinary	7,601 5 7	
Collectors { Slot meter	20,350 0 7	
Stationery and printing	7,363 3 11	
General charges	11,667 1 4	
Company's Auditors	112 10 0	
		56,299 6 4
Miscellaneous—		
Law charges		337 8 1
Parliamentary charges		649 1 1
Bad debts		604 12 7
Stolen from 519 slot meters broken open		209 3 11
Superannuation, sick, and accident funds		18,226 15 8
National Insurance Act charges		3,236 19 4
Gas Referees and Official Auditor		360 6 4
Leasehold renewal fund		1,000 0 0
War Fund		7,104 2 4
Total expenditure		£1,687,718 16 0
Balance carried to net revenue account		143,854 5 11
		£1,831,573 1 11

Receipts.

Sale of gas—		
Lady Day at 3s. 7d. per 1000 c.ft.	£672,004 16 6	
Midsummer at 3s. 7d. per 1000 c.ft.	475,053 6 4	
	£1,147,058 2 10	
Public lighting	17,950 14 2	
		1,165,008 17 0
Meters at rent	£49,181 19 10	
Stoves and fires at rent	36,534 1 6	
Gas-fittings at rent	35,141 10 4	
		120,857 11 8
Residual products—		
Coke, less labour and cartage	£360,846 4 11	
Breeze, " "	1,970 8 2	
Tar and tar products, less labour	93,311 18 9	
Ammonia and products " "	88,150 0 2	
		544,278 12 0
Rents receivable		1,333 1 9
Transfer fees		94 19 6
Total receipts		£1,831,573 1 11

Total amount paid in salaries for half year, £51,509 12s. 0d.
" " " wages " £511,169 14s. 2d.

Statement of Coal.

In Store Dec. 31, 1917.	Received During Half Year.	Carbonized During Half Year.	Used During Half Year.	In Store June 30 1918.
Tons. 263,126	Tons. 411,989	Tons. 603,420	Tons. 2090	Tons. 69,605

Statement of Residual Products.

Description.	In Store Dec. 31, 1917.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store June 30, 1918.
Coke—tons	37,577	371,596	72,828	274,132	62,213
Breeze—tons	8,536	61,646	31,712	30,935	7,535
Tar—gallons	608,054	5,480,698	5,505,072	..	583,680
Ammoniacal liquor—butts	10,710	221,910	224,523	..	8,097

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Total Quantity Accounted for.	Number of Public Lamps.
	Public Lights (estimated).	Private Lights (per Meter).		
Thousands. 7,206,018	Thousands. 118,987	Thousands. 6,744,860	Thousands. 6,970,395	24,749

Sir Samuel Bagster Boulton, Bart., the Chairman of Messrs. Burt, Boulton, and Haywood, Ltd., and of the Dominion Tar and Chemical Co., Ltd., founder in 1889 and since Chairman of the London Conciliation Board, who died on April 27, aged 87 years, left a fortune of the value of £374,312; the net personalty being £283,922.

COMMERCIAL GAS COMPANY.

Half-Yearly Report.

THE Directors submit the accounts for the half year ended June 30, 1918. The revenue account shows a net profit for the half year of £45,714 16s. 3d., which, added to the balance of £40,102 os. 10d. brought forward from the previous half year, produces a net revenue balance of £85,816 17s. 1d. Deducting therefrom £15,859 3s. 4d. for interest, there remains standing to the credit of the net revenue account a balance of £69,957 13s. 9d. available for dividend.

The Directors recommend the payment of dividends thereout at the statutory rates of £3 12s. p.ct. per annum on the 4 p.ct. stock of the Company, and of £3 p.ct. per annum on the 3½ p.ct. stock, both less income-tax. The balance of the net revenue will be carried forward to the next half year.

Owing to the increase in the cost of coal and other raw materials, and the extra payments to the Company's workmen by reason of the war, the Directors found it necessary to increase the price of gas from 3s. 6d. to 3s. 10d. per 1000 c.ft., as from the taking of the meter-indices at the Midsummer quarter.

WILLIAM GRAHAM BRADSHAW, *Chairman.*

The Accounts.

The accounts accompanying the report consist of the usual set of statements. They show that the paid-up stock on June 30 last amounted to £996,405; that £1,076,875 had been added by conversion, making £2,073,280; and that £149,298 remained unissued out of the total authorized capital (including premiums) of £2,235,000. The total amount borrowed at the date named was £339,062 10s., and £135,937 10s. was added by conversion, making a total of £475,000, and leaving £79,226 to be borrowed, out of the £550,000 authorized. Capital account receipts amount, with premiums, to £2,606,065 4s. 5d. The expenditure stands at £1,513,718 19s. 2d., with a nominal amount of £1,212,812 10s. added by conversion—together £2,726,531 9s. 2d. There is thus a balance of £120,466 4s. 9d. carried to the balance-sheet. A sum of £1267 4s. was expended during the half year on new and additional buildings, plant, &c., and £72 18s. 4d. on mains and services; but £13,143 12s. 10d. is credited for steamships, stoves, and prepayment meters and fittings. The reserve fund amounted at the close of the half year to £43,391, and the insurance fund to £28,855.

The following is the revenue account:

Expenditure.

Manufacture of gas—			
Coal and oil, including dues, carriage, unloading, and trimming	£249,373 16 10		
Salaries of engineer and officers at works	4,479 7 6		
Wages (carbonizing)	19,098 2 6		
Purification, including labour	1,958 13 10		
Repair and maintenance of works and plant, materials and labour (less £529 9s. 9d. received for old materials)	42,412 16 10		
		£317,322 17 6	
Profit sharing		184 6 3	
Distribution of gas—			
Salaries and wages of officers (including rental clerks)	£8,696 17 10		
Repair, maintenance, and renewal of mains and services, material and labour	8,995 8 7		
Repair and renewal of meters	3,327 18 11		
" " " " stoves	13,695 16 0		
" " " " prepayment meters and fittings	14,286 1 8		
Maintenance of mantles and fittings	1,516 11 3		
		50,518 14 3	
Public lamps—lighting and repairing		3,883 19 3	
Rent, rates, and taxes		14,628 19 9	
Management—			
Directors' allowance	£1,250 0 0		
Company's auditors	75 0 0		
Salaries of secretary, accountant, and clerks	1,560 2 2		
Collectors' salaries and commission	2,082 10 1		
Prepayment meter collection	7,357 17 7		
Stationery and printing	1,761 15 9		
General charges	2,330 8 6		
		16,417 14 1	
Bad debts		256 15 11	
Law and parliamentary charges		474 12 10	
Superannuations and allowances and Workmen's Benefit Society, &c.		2,726 9 4	
Official officers, &c.		127 10 9	
National Health and Unemployment Insurance		605 7 2	
Allowances to employees on active service		3,608 4 11	
Total expenditure		£410,755 11 6	
Balance carried to net revenue account		45,714 16 3	
		£456,470 7 6	

Receipts.

Sale of gas—			
Per meter (number in use, 115,072) at 3s. 6d. per 1000 cubic feet	£311,352 12 3		
Public lighting and under contracts	6,198 8 0		
	£317,551 0 3		
Less discounts and allowances	17,200 10 8		
		£300,350 9 7	
Rental—			
Meters (24,049)	£3,100 10 5		
Stoves (88,078)	14,380 2 10		
Prepayment meters and fittings (90,382)	20,174 1 8		
Maintenance of mantles and fittings	770 14 10		
		38,425 9 9	
Residual products—			
Coke, less £7849 11s. 3d. for labour	£79,074 2 2		
Breeze, less £2066 4s. 2d. for labour	357 14 3		
Tar	20,780 7 2		
Ammoniacal liquor and sulphate of ammonia	17,458 12 4		
		117,670 15 11	
Miscellaneous receipts—			
Rent receivable	—		
Transfer fees	23 12 6		
		23 12 6	
Total receipts		£456,470 7 6	

Statement of Coal and Oil.

—	In Store Dec. 31, 1917.	Received During Half Year.	Carbonized During Half Year.	Used and Sold During Half Year.	In Store June 30, 1918.
	Tons.	Tons.	Tons.	Tons.	Tons.
Coal	38,644	98,265	112,129	257	24,523
Oil—gallons . .	516,190	445,141	479,828	..	481,503

Statement of Residual Products.

Description.	In Store Dec. 31, 1917.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store June 30, 1918.
Coke—tons	3,810	72,884	10,022	59,897	6,775
Breeze—tons.	5,371	6,775	..	7,823	4,323
Tar—gallons.	630,867	1,193,937	..	1,171,581	653,223
Ammoniacal liquor—butts of 108 gallons	10,454	39,788	41,135	331	8,776
Sulphate of ammonia—tons	4	..	..	3	1

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Quantity Accounted for.	Number of Public Lights.
	Public Lights and under Contracts (estimated).	Private Lights, per Meter.		
Thousands.	Thousands.	Thousands.	Thousands.	
1,989,378	26,855	1,802,499	1,889,034	3,798

The final statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, oil, &c., £73,260; coke and breeze, £9198; tar, ammoniacal liquor, sulphate of ammonia, &c., £16,650; sundry stores. £65,339—total, £164,449. The figures this time last year were: Coal, oil, &c., £89,641; coke and breeze, £6539; tar, ammoniacal liquor, sulphate of ammonia, &c., £12,652; sundry stores, £54,014—total, £162,847.

ELECTRICITY SUPPLY MEMORANDA.

The electricity industry has had a rap over the knuckles from the Coal Controller for its want of economy in the consumption of coal. He has given this in a perfectly friendly manner, in the hope that it will have a rectifying effect.

Reproach from the Coal Controller.

The unfortunate thing is that station engineers cannot work miracles. They cannot, as if by magic, convert any old and poor efficiency plant into new high efficiency plant; they cannot alter their load and diversity factors to any considerable extent at the present time; and they cannot turn poor quality fuel into high quality. However, Sir Guy Calthrop says there is the "utmost and most" urgent need for the exercise of the strictest economy in the use of all classes of coal. But even in the best managed and most efficient electrical undertakings, there is still a very considerable margin between the possible efficiency and the actual results obtained. The difference between actual results and those which might be reasonably expected are in many cases most disappointing. The least coal consumption per unit of any undertaking is 2·026 lbs.; and the most 17·93 lbs. This is a very deplorable state of affairs. In a subsequent paragraph more particulars are given, which show the absurdity of some of the figures which electrical writers quote as the ordinary consumption per unit of electricity generated; and, in an editorial article, attention is drawn to how severely the Coal Controller has burnt his fingers in the allowance of electricity he has made per ton of coal under the Fuel and Lighting Rationing Order. However, Sir Guy points out the scope that there is for further economies in the generation of electric power; and he urges co-operation on the part of the station engineers. A further point that his investigation has informed him upon is that a large number of electric power stations pay little, if any, attention to the question of ascertaining the calorific value of the fuel that they are using, though this would be a valuable check on the quality, and would enable the Coal Control Department to deal promptly with any question that may arise. Nor is it customary to keep even an approximate record of the amount of ash produced by the coal burnt. The necessity for making full use of all "riddlings" and partially consumed fuel is also urged. The consumption of coke, too, is submitted to earnest consideration, in view of the insistent need for saving in all directions every pound of coal possible. While, too, recognizing the serious shortage of labour and other difficulties peculiar to the present time, he reminded station engineers that all steam and generating plant should be tuned-up, and be maintained in the highest state of efficiency. There is no doubt that Sir Guy intends to keep in close touch with the efforts made to improve the state of things to which he has called attention; for now he has arranged for the supply to him of returns every four weeks from all electricity concerns. One other suggestion (in the long communication) is that it may be to the advantage of the undertakings included in each coal-transport area if they could be associated for the purpose of considering quickly any details which may arise concerning their mutual interests. If a good case can be shown for anticipating substantial savings—such as in respect of the installation of new plant, the repair of old plant, and the linking-up of stations—then the Coal Controller promises his support to applications to the Priority Branch of the Ministry of Munitions.

Variable Coal Consumption per Unit.

The charge of sinful wastefulness on the part of electricity stations is distinctly proved by the Coal Controller. His eyes have been opened; and there is no escaping his evidence or refuting it. It is all in black and white, and sealed by statistics. He has taken the areas of the country as mapped out for the coal redistribution scheme; and from returns has compiled the average quantity of coal used per unit of electricity generated. It is a good piece of work; and it is startling in the distance there is between the best and worst averages per area. The tabulated results are worth putting on record, because they tell a tale which will act as a serviceable obstruction to the senseless claims that are sometimes made as to the economical use to which the electricity industry puts its coal supply; and it will be of further value to the gas industry in advancing its case as good coal economizers—economizers who extract a long list of serviceable things from the coal they use.

Area No.	Area under the Coal Redistribution Scheme.	Average Coal per Unit Generated.
		Lbs.
3	Durham	2·48
1	Northumberland	2·51
18	Scottish N.W.	3·09
4	Lancashire	3·21
5	Yorkshire	3·28
12	S. Wales and Mon.	3·41
14	S.-E. Counties and London	3·46
19	Scottish N.E.	3·95
10	Birmingham District	4·2
13	South-Western Counties.	4·2
16	Leicestershire	4·44
21	Ireland	4·48
2	Cumberland	4·53
11	N. Hants to Essex	4·59
20	Scottish S.W.	4·63
8	Eastern Counties	4·72
7	North Staffs	5·07
6	North Wales	5·62
17	Scottish S.E.	5·95
15	Derby and Notts	8·38
9	Salop	16·92
	Average	3·44

There will be less noise made now as to the electricity industry being (with the exception of the gas industry) the most economical users of coal. There may be worse defaulters in some other industries; but until the electricity stations in nineteen of the twenty-one areas in the country can show greater saving, then the time and occasion for boasting should be carefully selected by the electricians.

Supply Costs and Charges to Consumers.

There have been several endeavours to try to make current conditions and current costs of production and distribution rest upon the advance in the price of coal. There are coal clauses in some electricity and gas contracts; but those clauses fall short of provision in these times, seeing that other costs of production and supply have risen so enormously There are many factors contributing to increased costs; and this is recognized in the legislation dealing with gas lately passed by the New South Wales Legislature, which makes the extra allowance in charge to the consumer accord with the increase in total costs. The same plan was suggested to Sir William Middlebrook's Committee, but was rejected in favour of something that has been deservedly ridiculed by business and financial men who have come into contact with the Committee's proposals. It is because costs generally have advanced so enormously, and that coal is only one contributor to these costs, that we think the system by which France has sought to do justice to electricity suppliers falls short of what is required. The system is this: The supply authorities are allowed to charge for electrical energy at the pre-war price *plus* 0·2 c. per franc of increase in the price of coal above the pre-war cost. On this basis it is assumed that the consumption of fuel is about 2 kg. per KW.-hour; but in the case of small and uneconomical stations, the addition of 0·3 c. per franc may be authorized, while large modern undertakings are allowed an addition of only 0·15 c. In many places the cost of coal is based upon the contract prices paid by the French State Railways. The price to be charged during the coming quarter is often fixed in accordance with the actual cost of coal during the current quarter No difficulty is experienced in carrying out this system. The "Electrical Review" refers to the French system "as simple and unobjectionable." The only objection we have is the one mentioned, as to insufficiency of the basis of rectification as between costs and price.

National Kitchen at Wandsworth.

Wandsworth—the place of, in normal times, cheap gas down South, so cheap that electricity finds this factor of more importance in the commercial rivalry than all the vapid platitudes electrically generated—has now its National Kitchen. According to the "Electrical Times," the Committee who have had the matter in hand have been guided by the New Bridge Street (City) Kitchen and Restaurant and by Poplar and Marylebone, in both of which places the Borough Councils, in the interests of their electrical undertakings, drive everything possible to electricity to the exclusion of gas (no matter whether gas has the greater value for the particular purpose). So guided, readers are led to assume that the Wandsworth Committee have adopted electricity for all cooking purposes except those for which the existing supply of steam could be employed. We recently pointed out that the New Bridge Street Kitchen has rather a considerable amount of gas-heated appliances installed in it; those in authority there having tried to hold the balance as nearly as possible evenly as between gas and electricity—awarding to the former the part of the work in which electricity is really such an economical failure, and giving to electricity the work in which it can show its best success if extraordinary care is taken to repress loss by radiation. Steam is also very considerably employed. In the first article on the Wandsworth Kitchen, the "Electrical Times" believed it "to be true that no gas whatever was to be made use of." But its belief was subsequently changed; for since then a six-ring hot-plate, 4 ft. by 2 ft., has gone in. As this piece of apparatus was only introduced a few days before the opening, it may be fairly assumed that the electrical plant did not come up to expectation. But, of course, the major part of the work is accomplished by steam. Much that has been done at Wandsworth is similar to what has been done at Poplar; even the Lady Superintendent comes from the Poplar National Kitchen. Current is to be supplied to the kitchen at 1·15d. per unit. Some people seem to be under the impression that current is being given *free* to the kitchen for the first quarter. Whether or not this is true, we do not know; but if it is, this, rather than inherent merit, may have had something to do with the choice of electric-ovens and auxiliary equipment. Gas at the present time in the borough is charged at 3s. 5d. per 1000 c.ft. (in pre-war times it was about half that price); but at the 3s. 5d. rate 1·15d. will purchase 28 c.ft. of gas, which, at the standard rate of 500 B.Th.U. per c.ft., is equivalent to 14,000 B.Th.U. Now does anyone claim that 14,000 thermal units gas generated cannot be made to do more than 3420 B.Th.U. electrically generated? If so, we should like an explanation. At the old price, nearly double the quantity of gas and of thermal units would have been supplied at 1·15d., and that is a condition which electricity knows it has before it again (or something approaching it) when peace comes and prices change.

POPULARIZING THE GAS-ENGINE.

By E. DAVIES, of Birmingham.

THE popularity of gas-engines of various makes often wanes with purchasers, and very frequently through no fault of the engines. But makers are not altogether blameless for this. Take, for instance, the following sentence from one of their recent catalogues: "Our engines require no skilled attention."

Now many buyers, with no knowledge whatever of mechanical engineering, accept the statement as read, and consequently feel quite justified in handing their engine over to the care of a navvy or other incompetent attendant, until valve troubles, or hot bearings, &c., ensue; and naturally their surprise and annoyance are great and genuine on having to call in a skilled artisan to effect the repairs.

Another cause of unpopularity is that in recent times district representatives of gas-engine firms of repute (probably owing to competition and keen prices) are inclined to minimize the gas consumption figure—cubic feet per brake-horse-power-hour—to probable customers, so as to secure an order. The figure is exceeded on the engine being put to work; the agent then reprehensibly attributing the cause to be the fault of the local gas undertaking, in varying their district pressures, and also to the difference in the calorific value of the gas supplied when compared with the town gas where the engine was manufactured. Of course, such a practice could not be tried upon gas engineers, who when placing an order for a new gas-engine generally insist upon a duration test of four or six hours, at the maker's works—the test being watched on the gas engineer's behalf either by his own representative from the gas-works or by an insurance company's inspecting engineer. Another unpleasant surprise the buyer sometimes gets, is to find a circular enclosed with the engine advocating the use of the maker's special gas-engine oil, with this ominous foot-note: "Our guarantee with this engine only holds good on condition that our special oil is used." Whether this would be upheld in a Court of Law is questionable.

Often a gas-engine gets a bad reputation for the difficulty in starting it, probably through some small oversight on the part of the attendant. The writer was once called in to a new engine at a corporation sewage works, on which for some hours two men had been turning at the flywheel, and the ignition charge had been pumped in repeatedly, but with no result, because the governor had not been propped-up for opening the gas-valve. Yet none of those present could be blamed for the omission, as no mention was made of this requirement on the instruction card. If a small paragraph had appeared worded thus: "The governor must be propped-up for starting; and on the engine attaining its full speed the prop will fall automatically," all the labour and gas wasted would have been saved.

To make gas-engines more popular, it is up to the makers to discard the aforementioned methods of securing orders, and instead of the elaborate instructions (which often read complicated to a skilled engineer) a few good practical working hints should be substituted that the man in the street could understand, such as the following:

If the electrical ignition fails to ignite the charge after an engine has been standing for some time, take out the ignition block complete and warm same in a gas jet or fire, to overcome any dampness.

Do not fix the gas-bag on a damp wall, as it may cause the valve to rust and prevent the gas-bag inflating.

For grinding-in the valves, do not use emery powder, if carborundum powder is obtainable, as the latter is much more suitable.

In adjusting the valves, bear in mind that when the engine is in the starting position, with all valves down on their seatings, the clearance between the rollers and cams should be equal to the thickness of a steel rule, which can be inserted as a test-gauge.

Stock a spare set of connecting-rod bolts, to replace those in use, while the latter are being annealed—a process advisable once per annum.

A few wrinkles like these would be appreciated by owners, when in a dilemma.

Gas engineers, who are occasionally consulted by intending purchasers of gas-engines, do their share towards making them popular, and some gas undertakings to encourage their use will instal larger service mains gratis, if the surmised increase in consumption of town gas warrants it.

The Newcastle and Gateshead Gas Company some time ago engaged and placed upon their staff a practical and technical gas-engine expert, so that they are in a position to give to all probable power consumers reliable advice on any details in connection with gas-engines. This is certainly a step in the right direction towards popularizing the gas-engine.

Pitch under Gas-Plant Boilers.

Writing on the subject of pitch fuel for steam-boilers, Mr. J. B. C. Kershaw says that the increase in the output of pitch in the United States during the war, and the fact that over 2 million tons are now produced annually in the tar-distillation works of the country, have led to a revival of interest in the possibilities of pitch as a fuel, either for burning in the solid condition under steam-boilers, or for use in the liquid state in internal combustion engines. The managers of certain gas-works are reported to have solved the problem of burning pitch under Lancashire steam-boilers with the aid of forced draught and a special type of channelled solid fire-bar, known as a pitch bar. Some of the ordinary fire-bars of the furnace are removed and the pitch bars substituted; the number and distance apart of the latter depending upon the character and volatile matter contained in the fuel that is being consumed on the other portions of the furnace-grate. The pitch, broken to a convenient lump size, is fed into the front end of these special pitch bars—preferably by some type of mechanical feed, which will maintain a regular supply without opening the furnace-door. The heat of the surrounding fire causes the pitch first to melt and flow down the channel of the bar and then volatilize. The rate of the volatilization is said to be controlled by the form of the bars; and the forced draught supplies the surplus heated air which is required to secure the combustion of the hydrocarbon gases produced from the molten pitch. The partly coked residue which remains after the more volatile constituents have been driven off and burned, is then pushed to the rear portion of the grate, where its combustion as ordinary coke offers no special difficulties.

Coal and its Scientific Uses.—There has been received a copy of "Coal and its Scientific Uses," by Dr. William A. Bone, F.R.S., Professor of Chemical Technology in the Imperial College of Science and Technology, Chairman of the British Fuel Economy Committee (1915-1917), and formerly Livesey Professor of Coal, Gas, and Fuel Industries in the University of Leeds. Pending the opportunity of reviewing the contents, it may be said that the book is one of a series of Monographs on Industrial Chemistry edited by Sir Edward Thorpe, C.B., LL.D., F.R.S., Emeritus Professor of General Chemistry in the Imperial College of Science and Technology, and deals, among other subjects, with the carbonization industries, the complete gasification of coal, water gas and its applications, and surface combustion. It extends to some five hundred pages, and includes nearly a hundred illustrations. The publishers of the book are Messrs. Longmans, Green, & Co., of Paternoster Row, E.C., and the price is 21s. net.

THE CHEMICAL ENGINEER.

At a well-attended meeting in London, on Monday last week, of those interested in the chemical industry, definite proposals were made for the development of chemical engineering, either by way of a special section of the Society of Chemical Industry or as a separate body. The matter was first brought up early in the year at a meeting of the Chemical Industry Club.

Explaining the position to the meeting, Prof. J. W. Hinchley said that a Special Sub-Committee of the Council of the Society had been formed to meet a delegation from those who had started the new movement, with a view to submitting a report to the Council. It had been suggested that, instead of calling the new body a Chemical Engineering Section, it should be called the Chemical Engineering Group. What was aimed at was to avoid the formation of a new society; but the first resolution which he had to propose had been drafted in such a way as to leave them freedom of action. It was: "That a group be formed for the promotion and study of chemical engineering." The resolution did not bind them to the Society of Chemical Industry; and the intention was that the group should come into existence that evening, in order that they could approach the Society with a view to becoming a section or group of the Society.

The resolution was carried unanimously, as also were motions that a Committee with powers to act be elected, that a special subscription be levied to cover the cost of the organization and work, and that one of the objects of the group be to vigorously promote chemical engineering research.

Mr. Sage remarked that he desired to see a new race grow up of real chemical engineers. He had met them in America, but had not seen more than half-a-dozen men in this country whom he would call chemical engineers. Mr. Anfillagoff said the chemical industry would never get on without the chemical engineer; but at present in this country the so-called chemical engineer was neither an engineer nor a chemist. He believed that in future a chemist would not be worth his salt unless he also learned engineering, in the same way that engineers learned chemistry. Mr. Ratcliff mentioned that the Manchester University were deeply interested in chemical engineering, and were about to make a serious effort to train students as chemical engineers.

After a short discussion, the subscription was fixed at one guinea, and a temporary Committee was appointed to draw up the rules, which will be reported to a meeting in the autumn. The intention is that the group should arrange from time to time for papers on particular subjects, and hold conferences at different centres throughout the country.

The Maxon Premix Burner.

In the course of an article in which he explains the reasons for his belief that gas can for fuel purposes monopolize the baking industry, whenever the industry as a whole sets its mind to getting the business, Mr. Edward F. Davis, in the "American Gas Engineering Journal," describes the "Maxon Premix Burner," which, it is claimed, embodies the principle of mechanically mixing air and gas for combustion in the simplest possible form. A gas and air valve is fixed on the inlet of a small electric motor-driven blower; the motor being directly connected to the blower, and operated at a constant speed. Gas and air are taken into the blower in any proportion that is desired, and thoroughly and intimately mixed by the fan. The mixture is then driven forward to the point of ignition at a speed considerably in excess of that of flame propagation. Ultimately the stream of gas and air is burned in contact with a bed of fire-clay balls placed on the grate in the oven. The "Maxon Premix Ratio Valve" is a combined gas and air inlet-valve, by means of which the proper proportions of both gas and air are automatically obtained. The rotary sleeve over the air-ports is turned simultaneously with the opening of the gas-valve; and gear-teeth between the lever and the sleeve constitute a graduated adjustment of the air intake. Therefore, by means of one common lever control, a fixed amount of gas is proportionately admitted with the requisite quantity of air for perfect combustion. The velocity of the gas draws in the air through the openings always in the right proportion to the amount of gas being used; the turning of the gas-valve automatically opening the air-ports in proportion to the gas consumption. "Give the baker the right heat at the outset," says Mr. Davis, "even if you do think the heat he asks for is too high. Then, after getting him started, and he sees that you can give him any heat he would require, he will not have any objections to having you try and see what you can do for him in the way of cutting down his gas consumption."

Producing Coal Gas on Board Ship.—An invention by a Danish Engineer for the continuous production of coal gas on board ship, for propulsion purposes, has been referred to by the "Deutsche Nautische Zeitschrift." A large motor cutter belonging to Frederikshaven has made a five days' voyage with gas manufactured on board. The gas-producer is placed in the fore part of the ship, near the mast, and takes up but little room. According to the inventor, the gas costs only one-third the price of petroleum; and the plan is claimed to be well adapted for fishing vessels.

DETERMINING SPECIFIC GRAVITY OF VISCOUS TAR, ETC., AT DIFFERENT TEMPERATURES.

By A. Renfred Myhill.

It is sometimes necessary to construct a graph or a table for converting the specific gravity of tars, &c., from a known temperature to (say) 15·5° C. This is often the case when tar is sold; its gallonage being measured when hot at the works and afterwards, by the buyers, after it has cooled down on the journey.

By most of the ordinary standard methods—viz., bottle or hydrometer—it is difficult, if not impossible, to carry out a satisfactory test of the density at various temperatures. If the hydrometer is used, the tar will often be found to be too thick for the instrument to sink into it at atmospheric temperature; while if the bottle be used, it is very difficult to prevent invisible air spaces. It is also practically impossible to regulate and accurately ascertain the temperature, when high, as a thermometer cannot, of course, be placed actually in the tar. The following method has been used by the writer for the purpose, and has been found to be quite satisfactory.

A long glass tube, ¾ in. to ½ in. internal diameter, and of thin glass is sealed at one end. The length should be about 2 ft., and it should be possible to weigh it on a balance. This can usually be done by weighing with the case of the balance open or removed. The tube is weighed with a thermometer inside it. It is then placed in a vertical position in a glass water-jacket, of about 2 in. diameter and 2 ft. high.

A small portion of the tar is then warmed in a beaker; the vessel standing in another beaker of boiling water (on the "glue-pot" principle), so as to raise the temperature of the tar to about 100° C., at which temperature all tars are fairly fluid. It is then poured into the tube by means of a funnel; the water-jacket meanwhile being full of water at, or slightly below, boiling point. The thermometer which was weighed with the tube is removed before the tar is poured in. Care should be taken that no tar adheres to the walls of the tube above the level of the main portion in the tube. If this should happen, the local application of a wad of cotton wool tied on the end of a glass rod will remove this excess. On standing for a few minutes in the hot water, the surface of the tar in the tube should become quite level, and well defined. A stirrer should be used in the water-jacket so as to maintain an even temperature.

The level of the tar in the tube is now marked by means of a file-scratch, and its temperature taken by immersing the bulb of the thermometer in it. The thermometer is afterwards allowed to drop to the bottom of the tube containing the tar, and the whole weighed. The difference between this weight and the weight of the thermometer originally taken, gives the weight of the tar. The tube is now carefully cleaned out, removing the bulk of the tar by immersing in boiling water to soften the tar (which, when cold, has become quite viscous), and finishing with a wad of cotton wool soaked in benzene.

It is now necessary to determine the volume of the tar up to the level of the file mark which was made upon the tube. This is readily done by allowing water to run into the tube from a burette, and noting the amount run in. A small error, almost negligible, arises, on account of the fact that the tar was hot when the file mark was made—consequently, the glass tube itself was of slightly greater capacity than when cold. This source of error may be nullified by running in cold water from the burette; the tube itself being immersed in the hot water jacket at a temperature somewhat higher than that at which the tar previously was.

Using the tube as a stirrer, the water in the jacket is stirred-up until, owing to the cooling effect of the water in the narrow tube, its temperature drops to that of the original tar. The level of the water in the tube, which should now be a fraction of an inch lower than the file-mark, is then adjusted by running in a little more cold water from the burette. In this way, a true indication of the volume of the tar is obtained.

The specific gravity of the tar at the particular temperature is calculated by dividing its weight by its volume. It is only necessary to carry out the above procedure for two or three other temperatures (say, 20° to 30° C. apart) in order to be able to construct a graph by which it would be possible to calculate the correction to be applied for converting the volume of tar from any temperature to a standard temperature.

When the tar is being tested at such a low temperature (say, atmospheric) as to be very viscous, it is necessary to allow it to cool-down from a temperature much higher, and to be very careful to preserve a sharp line of surface while the tar is contracting.

With reference to any error which might be introduced by the expansion of the glass tube, it may be stated that, if a clear fused quartz tube is obtainable, it is far preferable to glass, as its co-efficient of expansion is practically *nil*. In this case, it is, of course, quite unnecessary to calibrate in a hot-water jacket.

The Council of the Royal Society of Arts have awarded the Albert Medal to Sir Richard T. Glazebrook, C.B., D.Sc., F.R.S., for (among other qualifications) his work as Director of the National Physical Laboratory since 1899.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Gas-Valve with Water-Seal.

Sir,—In the last issue of the "Journal," a view is given of a sluice-type of gas-valve with water-seal, which is described as an ingenious form of gas-valve with water-seal, of enemy design. May I point out that over four years ago Mr. F. S. Cripps and I applied for and obtained patent rights for a sluice or slide valve with water-seal, of similar design, of which the patent number is 12,249/14.

Our design, however, differs from that illustrated in the "Journal," which makes an ordinary wedge form of sluice-valve, inasmuch as the valve slides between two parallel faces, and is held against them by means of two volute springs between the halves of the disc, which is further pressed against the faces of the valve (through the action of a small wedge, also between the disc) when the operator gives the final turn to the hand-wheel.

With this construction, should any gas leak past one of the valve-faces, it will rise through the water and form a gas pocket in the top of the hood. The gas which collects at the same time displaces a portion of the water which leaks past the other slide. It will, therefore, be evident that gas can only leak through the one slide if water can leak past the other slide; and, in the event of such leakage taking place, the degree thereof will be dependant upon the rate at which the water can escape. And as only a trifling quantity of water can pass through a small leak, only a small quantity of gas can leak into the seal. It will also be evident that no gas can pass the second slide as long as the slides are immersed in the water-seal.

It seems that if our countrymen did not know of this fact, they would be likely to attribute inventions to our enemies which belong to ourselves; and I am moved to send you this letter in the hope that it will dispel such thoughts.

R. J. Milbourne.

Lilleshall Old Hall, near Newport, Salop, Aug. 2, 1918.

Prices of Stoves and Meters.

Sir,—"I said in my haste: All men are"—profiteers!

I am sure Mr. J. G. Hawkins, of Wisbech, wrote his letter [*ante*, p. 167] to you respecting the further advance in the price of stoves (and brought in afterwards a reference to meters) in haste rather than after doing what is so necessary in business, as in private life—namely, putting one's self by imagination in the other man's place. How would Mr. Hawkins like consumers to judge of the almost continual increases in the price of gas that are being announced throughout the country in the same spirit, and with as little consideration of the impelling causes, as he shows in the judging of stove and meter makers?

The gas industry is, with good cause, invoking the assistance of Parliament to enable it to increase its prices without suffering the full statutory reductions in dividend. What are the causes which are compelling the industry to do what no gas manager is anxious to do—namely, raise prices? Neither more nor less than those which are compelling the gas and meter makers to do what no stove or meter maker is anxious to do—namely, raise prices. The greatly enhanced wages for labour of lower quality, much dearer fuel—coal, coke, and gas—enormously increased cost of raw materials, and reduced output, are the compelling causes.

Supposing a consumer wrote to the local press suggesting that "the time has come when all gas (or coke) consumers should cease using any more gas (or coke) till it can be obtained at a reasonable price"—would Mr. Hawkins think that the consumer was justified in his suggestion of unreasonable charges?

I am sure I am speaking for all my fellow manufacturers when I say that we should face without a qualm an inquiry into our costs and charges, pre-war and present, and that we would be only too glad to get back to pre-war conditions and pre-war charges.

Why cannot Mr. Hawkins mete out to those from whom he buys the same justice that he would expect from those to whom he sells? I am afraid the war is getting on the nerves of a good many of us, and making us see evil in everyone but ourselves. It is an unhealthy, and un-English, state of mind.

Cyril G. Davis.

60, *Oxford Street, W., July* 29, 1918.

Increased Price Recommended at Manchester.—The Manchester Gas Committee, last Thursday, decided to recommend the City Council at their meeting to-morrow (Wednesday) to increase the price 4d. per 1000 c.ft., to all classes of consumers. The increase is attributed to the extra cost of coal, which is estimated to be about £80,000.

Maidstone Gas Company.—The accounts of the Maidstone Gas Company for the year ended June 30 show that, after providing for all fixed charges, including £2000 depreciation in respect of stoves and fittings, and £1831 to the renewals fund, there remains an available balance of £15,146; and the Directors recommend payment of a dividend at the rate of 4½ p.ct., less tax, for the past half year, an interim dividend at the same rate having already been paid. The insurance fund has been brought up to the full statutory limit within the year. Sales of gas show an increase of 8 million c.ft. over last year, or 2·5 p.ct. To facilitate the handling of rail-borne coal and the dispatch of coke, a siding from the South-Eastern and Chatham Railway line into the Company's works is in course of construction. The Directors record the death of Mr. Robert Hoar, who had acted as Clerk to the Company for 35 years. Fifty-eight of the employees have joined the forces since the commencement of the war. In order to meet additional costs under the heading of coal and labour, an increase of 4d. per 1000 c.ft. in the price of gas has been necessary, to take effect from the June quarter readings.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The Maidenhead Gas Bill was read a second time, and committed.

Statutory Undertakings (Temporary Increase in Charges) Bill.

On Monday of last week, the Bill was read a second time, and the Committee stage fixed for Friday.

Lord Somerleyton moved the second reading.

The Marquess of Crewe, while not opposing the motion, protested against the alteration that had been made in the Bill from half to three-quarters. He said the effect upon London of this change was very serious; and therefore the London County Council and other corporations desired to enter the strongest possible protest against the Bill. In ordinary times a considerable portion of the profits of gas companies was obtained from the sale of residual products; and many of these had increased greatly in value since the war began. The companies, however, had not been permitted to benefit by these higher values. He would be glad that the shareholders should receive the additional dividend; but the burden ought to fall upon the country as a whole, and not upon the gas consumers alone.

Lord Balfour of Burleigh said that on the Committee stage of the Bill he would bring forward an amendment varying the scale upon which relief might be given to the companies, according to whether or not they had set aside a reserve fund.

Lord Buckmaster said he could not understand what case could be made out for relieving gas shareholders which could not be applied to innumerable private individuals who had suffered more by the incidence of the war.

Lord Parmoor expressed the opinion that the Bill was a dangerous one; and the only slight justification for it was to be found in the recommendation of the Select Committee. They were substituting for statutory parliamentary protection the mere action of a particular Department for the time being.

Lord Somerleyton pointed out that the companies were under statutory obligations to continue their business, and were not in the position of a tradesman who could close his shop.

In Committee on Friday,

The Marquess of Crewe moved an amendment providing that in cases other than those of a local authority no modification shall be authorized which was more than sufficient to enable a dividend on the ordinary stock to be paid at half of the standard or maximum rate of dividend prescribed for the undertaking, or at half of the pre-war rate of dividend, whichever was lower.

Lord Somerleyton explained that this matter was left an open question by the Government when under discussion in the House of Commons.

On a division, the amendment was rejected by 32 votes to 3.

The Bill afterwards passed through Committee without amendment. It was down for third reading yesterday [Monday.]

HOUSE OF COMMONS.

Progress of Bills.

The Wandsworth, Wimbledon, and Epsom District Gas Bill was read the third time, and passed, with amendments.

The Gas Light and Coke Bill and the South Shields Gas Bill were read a second time. The Committee are to strike out the "Financial Hardships" provisions.

The following petitions against the Bills named have been withdrawn: Brentford Gas Bill, the Duke of Devonshire, the Middlesex County Council, the Richmond Corporation, and the Wandsworth Borough Council. Gas Light and Coke Bill, the Kensington Borough Council and the Wandsworth Borough Council. Portsea Island Gas Bill, the Portsmouth Corporation. South Metropolitan Gas Bill, the Wandsworth Borough Council.

The Royal Assent is notified to the Aldershot Gas, Water, and District Lighting Act and the British Gas Light Company (Norwich) Act.

Female Labour in Gas-Works.

Colonel W. Thorne asked the Minister of Munitions whether he had issued an order to gas-works to employ women labour in retort-houses; if he was aware that the representative gas-workers' unions were strongly opposed to the introduction of women labour in retort-houses, on the ground that the work was not suitable for the sex; and if he would undertake to consult workmen's organizations before issuing orders vitally affecting labour interests.

Mr. Kellaway replied that a circular had been issued recently to gas-works,* drawing their attention, in view of the increasing shortage of male labour, to the success which had attended the employment of women under suitable conditions in certain retort-houses. He was aware that the General Workers' Union had taken exception to the introduction of women; and the department had asked them to discuss the question. There had already been consultation on the subject with the workmen's organizations in various localities where the introduction of women into retort-houses had been proposed or adopted.

Oil Production.

Captain Wright asked the Minister of Munitions whether the Mineral Oil Production Department were only able to obtain raw material for the production of oil subject to the consent of the Coal Controller; whether, owing to the attitude of the Coal Controller, the

* This circular will be found on p. 203 of last week's issue.—Ed. "J.G."

scheme for the adaptation of vertical gas-retorts had been deferred; how many such retorts had been adapted and were now in operation; and what sum of money had been expended in this direction?

Mr. Kellaway said supplies of raw material for the production of oil were obtained in agreement with the Coal Controller. Difficulties which had arisen were now under negotiation. The retorts at the Radford [Nottingham] Gas-Works were the only ones completed and in operation. They were capable of dealing with all the cannel as yet available. The retorts at eight other gas-works were in process of adaptation, and should be completed in time to deal with the additional supplies of cannel which it was hoped would become available. An expenditure of £97,300 had been sanctioned for the whole scheme, of which £21,000 had been paid.

The Richards Low-Temperature Retort Patent.

Captain Wright asked the Minister of Munitions if, when unrestricted permission was given by the head of a Department other than the Inventions Department to an official to apply for a patent in his own name, that permission included the right to use Government time and materials and the services of other Government officials for preparing the detailed plans and specifications required by the Patent Office.

Mr. Kellaway said it did not.

Captain Wright asked whether the retort for which Mr. Bradley was allowed by the head of his Department to apply for a patent was merely an adaptation of the Richards retort, the working drawings of which had been placed at the disposal of the Government.

Mr. Kellaway replied that the Richards low-temperature retort and process appeared to have been fully described in the "Gas Journal" on April 8, 1913; so presumably the method was well known. It was stated in this report that the invention had already been patented by Mr. Richards; and therefore it would not appear that any subsequent patent granted four-and-a-half years later would in any way prejudice Mr. Richards's patent. No trace could be found of any working drawings having been placed at the disposal of the Department in which Mr. Bradley was working. The two methods seemed to present considerable differences.

Captain Wright asked whether an inquiry would be held into the matter, about which there had been considerable complaint, and information concerning which was sent in some time ago.

Mr. Kellaway: The information was examined by Lord Crewe's Committee; and they found there had been nothing improper. If there is any new fact, we shall be glad to consider it.

Miners and Coal Rationing.

Mr. Houston asked the President of the Board of Trade whether he was aware of the inconvenience, and in many instances hardship, inflicted by the Fuel Rationing Order and restrictions; and that the allowances for coal, gas, and electric light were inadequate, even for those who practised strict economy. He also wished to know whether miners were exempt from the provisions of the Order.

Sir A. Stanley replied that he was aware that there might be some inconvenience attached to the restrictions in the Order; but it was hoped that actual hardship would be avoided. The Order was framed with this intention. Free coal was allowed to miners in only two counties; but cheap coal was allowed in most of the coal-mining districts.

Fuel Restrictions and Hot-Water Systems.

Mr. O'Grady asked the President of the Board of Trade whether he was aware that the recent Coal Order restricting the household consumption hit those persons having no hot-water system in their houses.

Sir A. Stanley said the question of the hot-water system did not affect the allowance of fuel under the Household Fuel and Lighting Order. Rooms counted for fuel quite apart from the particular rooms in which the fuel was consumed. Rooms gave the best indication of the needs of households for the purpose of establishing a scale.

Petroleum Production Bill.

A Bill to make provision with respect to the searching and boring for and getting petroleum, was presented and read a first and second time.

Burghs Gas Supply Act, 1876.

Mr. Currie inquired whether the Bill to modify the borrowing powers conferred on municipalities by the Burghs Gas Supply Act of 1876 would be introduced before the House rose on Aug. 8.

Mr. Munro replied that he hoped so.

An Amending Bill was subsequently introduced by Mr. Munro "to extend the purposes for which the gas contingent guarantee rate under the Burghs Gas Supply Act may be levied."

The Tozer Low-Temperature Retort.

Mr. Wright asked the Minister of Munitions whether his attention had been called to the case of Mr. R. W. Bates, formerly assistant to Mr. Lambourne at the M.M.O.P., and now with Sir A. Churchman, who had applied for a patent for an annular low-temperature retort, based on the Tozer annular retort; whether Mr. R. W. Bates was frequently, in the course of his official duty, at the Battersea works, supervising tests in, and had access to all the details of, the Tozer retort; whether unrestricted permission was given to Mr. R. W. Bates by the head of his Department to apply for this patent; whether Mr. Bates, in preparing his application, used Government time and materials; and whether he would now grant the inquiry asked.

Mr. Kellaway replied that Mr. Bates had applied for, and had been granted, a patent for an improvement in vertical retorts. It was a combination which had nothing in common with the claims for the Tozer intermittent retort except that both related to the same general class of apparatus. Mr. Bates's duties were as described; and he had access to such details as could be observed when the plant was in use and when standing. The permission given to apply for the patent was not unrestricted; on the contrary, the Government had the right of free user and assignment. The improvement to existing forms of intermittent annular vertical retorts was worked out for the use of the Department to which Mr. Bates belonged, and so was done during ordinary working hours with Government materials. As he was satisfied that the sanction to Mr. Bates's application for a patent was granted by the head of his Department in a proper manner, he did not see the necessity of holding any inquiry.

Fuel and Lighting Order Deputations.

In reply to questions as to when the President of the Board of Trade would meet members to discuss the working of the Household Fuel and Lighting Order,

Mr. Wardle said the President had agreed to see the London members to-day [Tuesday], and would be pleased to see any country members the day after.

THE HOUSEHOLD FUEL AND LIGHTING ORDER.

In the House of Commons last Wednesday, in connection with the vote for the salaries and expenses of the Board of Trade, there was a long debate on the subject of fuel control.

Sir J. Walton said that, if the Coal Controller had not imposed the most needlessly hampering restrictions and regulations, the output of coal now would have been much more than was actually the case. What was needed was more rapid transit and return of trucks to the collieries. The 4s. per ton increase allowed by the Coal Prices Limitation Act did not meet the increased costs; and since the Coal Controller came into possession, there had been rises of 2s. 6d., 1s. 6d., and 2s. 6d.—making a rise of 10s. 6d. per ton altogether. Anything more absurd than the new Household Fuel and Lighting Order had never been made.

Mr. Runciman declared that the Order would have more to do with unrest, discomfort, and ill-health in the coming winter than any change which had been made by the Government since the beginning of the war. Gas-fires which had been put in by householders when urged to burn gas rather than coal, now proved to be practically useless. It was quite apparent that the poor householders of the United Kingdom had not yet wakened up to what the Order meant. The industrial population of the North of England were not habitual readers of the "London Gazette;" and the newspapers had not yet given a full account of the Order. As to lighting, so far as he could gather, the Order did not provide for a differentiation between the North and the South of England in proportion to the number of hours of darkness. He thought it was incumbent upon the Board of Trade to postpone the coming into force of the Order until the public understood exactly what the prospects were.

Colonel Wedgwood also pleaded for the postponement of the introduction of the Order, and put forward the claims of the pottery industry to a more generous supply of coal.

Sir Daniel F. Goddard said the new Order was much more rigid and drastic than the one it superseded; and he thought it would fail to be complied with by the great majority of the people. The Order came into force on July 1; and it was impossible to get copies of it yet. If the Order could not be dropped, it should at least be ineffective until it could be read by everybody. If coke were not included in the Order, a great many people might be induced to use it instead of coal; and this would be a real saving. Some payment should be made to the public utility companies for the trouble they would be put to in making out the lists required. In Ipswich, there were over 15,000 houses in which gas was used through prepayment meters. These people were to have an allowance of 7500 c.ft. a year according to the Order; whereas the average consumption for each dwelling over a specified period had been 17,000 c.ft. What were they to do?

Sir Willoughby Dickinson said the limit of consumption should be fixed at a much earlier date than the end of twelve months. People should be rationed by the month, and be informed when they were exceeding their monthly supply.

Sir A. Stanley said he regretted copies of the Order had not been obtainable at an earlier date; but the delay was entirely due to sickness—influenza among the printers. Copies would be provided in abundance in the course of a few days, as well as a very good *précis* of the Order. There would also be issued a form for every householder to fill up. In essentials, the Order was practically the same instrument as was issued last winter when London was rationed. If all expectations were realized, there would still be a deficit of 15 million tons of coal to be met; and he proposed to do this by means of the new Order, which would secure an estimated saving in household consumption of 8 million tons. It was expected to secure a further saving of coal consumption of 7 million tons, through a system of rationing, by priority, of industries. Obviously under the Order large establishments and institutions must be treated specially; and the Order made provision for this. The Order also made provision in respect of electricity and gas for lighting purposes, which he agreed was very restrictive. As regarded two or three roomed houses, the Order imposed no hardship. It was the same amount of coal as they had always been accustomed to buy. For dwelling-houses up to five rooms, all that had been done was to reduce the consumption by about 10 p.ct. Where a house had very large rooms, the Fuel Overseer was authorized to allow exceptions.

Mr. M'Kinnon Wood said he had put in several gas-stoves, which he could not now use. While his consumption of coal was reduced by one-half, his consumption of gas and electricity was reduced to one-tenth of what he was allowed on the reduced ration of last year. One member, who had had forty years' experience in the coal trade, said the coal merchants would never understand the Order. How was a poor woman who had to manage the affairs of a household in London to do so? They were going to have Fuel Overseers. They had not been set up yet; and the unhappy public had been consuming coal, gas, and electricity, in ignorance of the fact that they were liable to six months' imprisonment and a fine of £100 if they offended against the Order.

Mr. Nuttall said there was one point which had not been raised in

the debate. The amount of gas allowed was 15,000 c.ft. for a ton of coal. He was informed that the quantity of gas produced from a ton of coal was 14,000 c.ft.; but there was a residue left of fuel which was equal to another 14,000 c.ft. Therefore, the correct quantity of gas to be allowed was 28,000 c.ft.

Mr. HEMMERDE expressed the hope that they would be given a little more gas later on.

Captain CARR-GOMM referred to tenants in flats, and asked what was to prevent a short-time tenant from exhausting in a few months pretty well the whole supply of gas for the year.

Sir A. STANLEY said, broadly speaking, the amount of fuel that would be available next winter as compared with last would be about 25 p.ct. less. The date when the Order really took effect was 42 days from July 1—which was Aug. 11. It would be unfortunate that there should be any delay in putting the Order into effect. When the Government encouraged the installation of gas equipment, there was an urgent need for bye-products. He regretted the inconvenience now caused, which was due entirely to altered conditions. "It would," he went on, "be impossible, even if we had the coal, in all instances to allow a considerably increased use of gas beyond that provided in the Order, owing to the withdrawal of so many ships which were transporting coal to London and to other southern ports for services elsewhere, and to the fact that in a great number of instances the large public utility undertakings are not so situated that they are convenient of access for railway transit, and it is with the greatest difficulty that we are able to provide them with the necessary amount of coal even under the restricted arrangements. As I said before, I exceedingly regret that, having encouraged the public to undertake one thing, we find it necessary later to ask them to make other arrangements."

Mr. GILBERT expressed his belief that if the President of the Board of Trade could do anything to make these Orders simple and plain, so that people could understand them, they would be willing to help in the matter.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for July 31.]

Nos. 11,914—12,284.

BINT, F. C.—"Coal and gas economizer and heater." No. 12,099.
CAMPION, G. F.—"Gas-producers." No. 11,969.
DERRY, E.—"Gas-stoves for cooking, lacquering, drying, &c." No. 12,245.
DOLPHIN, J.—"Atmospheric gas-burners." No. 12,038.
DREWRY, J. S.—"Gas mixing and proportioning valves." No. 12,186.
ETNA LIGHTING AND HEATING COMPANY.—See Derry. No. 12,245.
HOWLETT & Co., M.—See Dolphin. No. 12,038.
HUNTER, T. M.—"Air-admission valves for atmospheric gas-burners." No. 11,990.
IONIDES, A. C.—"Heating apparatus." No. 12,202.
LACRE MOTOR CAR COMPANY.—See Drewry. No. 12,186.
LLOYD, G.—"Preparation of fuel oil from dehydrated tar." No. 12,102.
LORD, J. E. C.—"Obtaining valuable products from blast-furnace pitch." No. 12,193.
M'CAFFERY, J.—"Generating gaseous fuel for heating or firing furnaces." No. 11,989.
NORRBOM, E.—"Gas-engines." No. 12,010.
OTTINO, G. P.—"Storage of compressed gas." No. 12,055.
PEASE, E. L.—"Heat treatment of coal, &c., for the production therefrom of oils, combustible gases, ammonia, &c." No. 12,207.
PROSSER, H. R.—See Derry. No. 12,245.
SOC. D'ECLAIRAGE, CHAUFFAGE, ET FORCE MOTRICE.—"Production of high-percentage anthracene." No. 12,014.
TONNER, M.—See M'Caffery. No. 11,989.
WALLACE, A.—"Utilization of oil, &c., shales which in distillation produce bye-products." No. 12,250.
WILSON, A.—"Poking-apparatus for gas-producers, &c." No. 12,153.

Paisley Gas Undertaking.—The revenue last year of the Paisley Gas-Works was £101,000; and if prices remained unaltered it would this year be £103,000. For the current year, the estimate for coal is £59,385, an advance of 20 p.ct. The total expenditure is estimated at £118,260 for the present year; and an increase is proposed in the gas charge of 7d. per 1000 c.ft.

Quality of Gas at Worthing.—A petition was submitted to the Worthing Corporation by a number of residents, complaining of the extremely poor quality of gas now supplied, and asking the Council to use their influence to secure a better supply. The Borough Surveyor has now reported the result of tests made by him between July 4 and 9, and on July 18, from which it appeared that on each occasion both the pressure and the calorific power of the gas were above the standards prescribed by the Worthing Gas Order; and that therefore no action could be taken.

Lady Works Chemists.—Perusal of the advertisement columns of some of the Lancashire newspapers suggests that the lady works chemist, almost unknown before the war, has come to stay. It is stated that lady chemists have recently been engaged locally by the Wigan Coal and Iron Company; and now the newly-formed Wigan Metallurgical Company contemplate their employment for controlling scientifically the production of steel in their furnaces. The Wigan Mining and Technical College are providing the necessary training in this direction; and there is no doubt that openings for the chemist in industry will multiply in the near future.

LEGAL INTELLIGENCE.

BRIGHTON GAS COMPANY'S APPEAL.

Conviction Quashed.

On Thursday and Friday, the Brighton Borough Recorder (Mr. Boxall, K.C.) heard the appeal of the Brighton and Hove General Gas Company against convictions by the Borough Bench for having supplied gas of a calorific power of less than 500 B.Th.U on various dates. [See "JOURNAL" for May 28, p. 384.]

At the conclusion of the evidence [our report of which is unavoidably deferred till next week], the Recorder held that the Gas Company had shown that they had done their best; and the conviction was quashed. It will be recalled that, at the first hearing Counsel for the Company declared that, had they supplied gas of the calorific standard required by the Order, they would at the end of last summer have reached the end of their power of making gas at all.

AN AUDITOR'S RESPONSIBILITIES.

Action by the Calne Gas Company.

In the King's Bench Division, on Saturday, the 27th ult., Mr. Justice CLAVELL SALTER resumed the hearing of the action brought by the Calne Gas and Coke Company against Mr. G. J. Barron Curtis, incorporated accountant, of Bath [*ante*, p. 215]. Plaintiffs asked that the defendant should be ordered to refund to them a sum of over £700 of which a former official of the Company named Archard defrauded them, owing to the alleged negligence of the defendant in the auditing of the Company's books. Defendant denied liability.

Mr. SCHILLER, K.C., and Mr. PARR appeared for the plaintiffs; Mr. FOOTE, K.C., and Mr. WETHERED represented the defendant.

Further evidence for the defence was called.

Mr. *Chas. Comins*, chartered accountant, of Cannon Street, said he went through the Company's books and examined the balance-sheets for nine years previous to 1915. The paramount duty of an auditor was to see that the printed accounts and balance-sheet were accurate, and agreed with the books and showed the true position of the Company. There was no "royal road" as to methods that should be adopted by an auditor. The cash-book kept by the Company was not a proper cash-book. It only represented accounts between the Secretary and the Company. It did not include receipts paid to bankers direct, nor payments made to the Company by cheque. These only appeared in the pass-book. He had never seen this done before; and such a practice made it more difficult to detect fraud. So far as he was able to judge, Mr. Curtis carried out his audit carefully and conscientiously, and did all the usual things done in an audit of this character. In fact, he went beyond it, and performed a great deal of detail in seeing that books were accurate. In his own experience, receipt-books were never checked.

His LORDSHIP: Is it a part of his duty to make experimental dives or plunges?

Witness: As regards counterfoil receipt-books, in the case of a gas company, I suggest not. I know in ordinary businesses you may do that.

His LORDSHIP said in his opinion there were four matters that had to be tackled particularly—the general question of outstandings, the slot-meter collections, the large cash balances in hand, and erasures.

Witness said undoubtedly outstandings were higher than they ought to be. This was shown clearly on the balance-sheets; and there should be some explanation. An auditor should draw the attention of the directors to it. There was nothing to make one suspect fraud, as distinguished from laxity, when one examined the balance-sheet. If the outstandings appeared to be properly owing, the auditor would certify the balance-sheet. He had to see they were genuine debts. Mr. Curtis, in his opinion, did all that he could reasonably be expected to do regarding the outstandings. He carried out the audit better than one would be led to believe from Mr. Curtis's evidence in the witness box. In regard to the suggestion that it was improper to show arrears in respect of prepayment slot-meters, the witnesses were quite wrong in this respect, owing to the fact that they had no actual experience of auditing gas companies' accounts. Amounts collected in early January, which clearly related to gas consumed in the preceding quarter, were called outstanding debts. It was quite an ordinary item; and there was nothing to arouse any suspicion. In these small gas companies, it was usual to include them in the current year's receipts. The accounts shown due were a reasonable sum; and there was no need for the auditor to ask for an explanation. In the absence of suspicion, he saw no reason why an auditor should test balances at the end of quarters. There was nothing to arouse suspicion.

His LORDSHIP said the point in his mind was that defendant and his clerk for many years had the cash-book in their hands. Mr. Curtis said if he had known that Archard had these large sums in hand, he would have reported it to the Directors. The question was, Ought he to have known it?

Witness said in practice the cash-book would be examined by the audit clerk. If he (witness) had seen it personally, it would not have aroused suspicion in his mind, in the circumstances. There was nothing exceptional in a gas company having a cash balance of £300 or £400 in the hands of the Secretary. As to the erasures, they appeared upon the surface to be mere clerical errors. There was no attempt at evasion or deceit.

Cross-examined by Mr. SCHILLER, witness said in his view no

auditor exercising ordinary skill and care could have discovered the fraud.

On Monday, Mr. Comins was further cross-examined. He said if there was anything abnormal in the accounts it was the duty of the auditor to draw the attention of the shareholders to it.

His Lordship: If the defendant had ascertained as a fact that Archard had received between £200 and £300 of the Company's money, ought he to have taken any steps?

Witness: Yes; if Archard was in the sole employ of the Company.

Re-examined: The system and method of keeping the books was bad; but so far as they were kept, they were above the average of country book-keeping. The accounts were accurate for the whole of the ten years.

His Lordship: But it is a fact that Archard stole several hundred pounds?

Witness: Notwithstanding the arrears and robberies, the revenue had not been altered one sixpence. Some of the outstanding money had, in fact, been paid, and should be recovered from the person who had received it.

Mr. *Clare Smith*, chartered accountant, of London and Bristol, said he had not made any examination of the books; but having heard the evidence he should say the fraud which had taken place was what might be termed a "snowball fraud," which was difficult to detect in its early stage. An auditor was bound to audit the accounts from the books placed before him; and *primâ facie* he was bound to assume that they had been honestly kept. When suspicion was aroused, the whole position was altered. If the outstandings amounted to a large sum, he should bring the fact before the Chairman; and if he was assured everything was in order, he might be satisfied. It was a matter of judgment in each case whether he should make a report to the shareholders. The amount of arrears outstanding would not have caused him to suspect fraud; but he should have called attention to the fact that the debts were £2000 on a turnover of about £4000.

Mr. *Edward Grace*, chartered accountant, of Bristol, said it was not the first duty of an auditor to look out for fraud. He generally corroborated the evidence already given.

The whole of Tuesday was occupied with speeches of Counsel.

Judgment.

His Lordship on Wednesday delivered judgment. He said the case had occupied nine days in hearing; and he was satisfied that it was not a case which a Jury could have been properly asked to try. Plaintiffs were a small Provincial gas company, carrying on business in perhaps a somewhat easy-going manner; and defendant was an Accountant in business at Bath, who for 22 years had acted as Auditor of the Company. In 1906, the Secretary of the Company was Mr. Gough, a Solicitor, who had a young man in his office named Archard, who assisted him in his duties. In 1912, Archard practically took over the whole of the work; and in 1913, when Mr. Gough died, Archard was appointed Secretary, Manager, and sole Collector. He was entirely trusted by the Directors, and was a man of reputation. It now appeared that from and after 1906 Archard had devised a system of "snowball frauds," the nature of which was roughly that, having appropriated money of the Company which came to his hands, he covered up the fraud by omitting to enter to the credit of the Company in the books payments made towards the end of the audit period. With the aid of the money thus obtained, he squared accounts by paying a sum into the bank. He carried forward as owing money which had, in fact, been paid; and early in the following year he would give credit for these sums, so that application would not be made to the debtors. Towards the latter part of the time, Archard was undoubtedly overworked. The defendant knew this, and remonstrated with the Chairman—pointing out that the work could not be properly performed unless Archard had assistance. Before the war, the books were getting considerably behind. The collections from the slot meters were in arrear; and when the war came, matters got worse. In 1917, Archard, who was entirely unsuspected, was called-up for military service; and his books were found to be in arrear. They were written-up; and an examination disclosed the frauds. The present action was brought to recover from the defendant damages for negligence, and the amount of Archard's defalcations, together with the cost of the investigation. There was no allegation of any definite step which the defendant could have taken; but there was the charge, first, that he failed to discover the fraud, or to make inquiries which the circumstances rendered it incumbent upon him to do. One must guard against approaching the matter in the face of subsequent knowledge. There were many items in the books which might have led to discovery, if they had aroused suspicion. The defendant had no cause to suspect Archard outside the books. Whether the books should have put him on suspicion, was the matter he had to decide; but it was important to approach the case from the point of view that this was a periodical audit of books kept by a man whom defendant had no cause to suspect. The methods of the Company were somewhat old-fashioned, as was the plan of keeping the books. The auditor was not in charge of the book-keeping, as an accountant would be. It was not his duty to control and regulate; and he repeatedly complained to the Chairman that the books were not kept as they should be. The mere fact that the fraud was not discovered in a series of audits was not in itself conclusive evidence of misconduct in the audit; but the defendant certified that the accounts of the Company were not merely in accordance with the books, but that they represented the true financial position of the Company, which they did not. The certificates which the defendant gave were not true. Where an auditor issued a false certificate in this respect, it rested upon him to show that the unfounded belief on which the certificate depended had not been the result of any lack of skill on his part in conducting the audit; and the case must be dealt with on this footing. It was for the defendant to satisfy the Court that he had brought to bear in the conduct of the audit a fair average degree of care and skill. His Lordship at some length then dealt with the various allegations of want of skill, and said he came to the conclusion that the defendant had not been guilty of negligence, and that he had brought to bear the average skill and competence which he was bound by law to bring on his work. Therefore judgment must be entered for the defendant, with costs.

MISCELLANEOUS NEWS.

PRODUCTION OF FUEL OIL FROM HOME SOURCES.

A "Ministry of Munitions of War" Report.

There was issued last Friday the report of a Committee appointed by the Minister of Munitions, with these terms of reference.

"To consider the report which has been rendered by the Petroleum Research Department on the production of fuel-oil from home sources, and to advise to what extent, and within what time, it should be possible under present conditions to carry out the proposals made in this report; and to consider the steps which have been taken by the Ministry of Munitions in this connection."

The Committee consisted of:

Marquess of Crewe, K.G., Chairman.
Lieutenant-Colonel A. Stirling, M.P.
Lieutenant-Colonel Godfrey Collins, M.P.
Sir Lionel Phillips, Bart.—representing the Ministry of Munitions.
Engineer Vice-Admiral Sir G. G. Goodwin, K.C.B., Engineer-in-Chief of the Fleet—representing the Admiralty.
Sir Richard Redmayne, K.C.B.—representing the Controller of Coal Mines.
Mr. G. C. Smallwood, Secretary.

The Committee held thirteen meetings, during which twenty witnesses were examined, and a considerable amount of documentary evidence was placed before them; and they have now submitted the following report consisting of two main sections: (*a*) Dealing with the supplies of cannel coal and kindred substances; and (*b*) the collection and transport of the raw material and method of retorting.

Supplies of Cannel Coal and Kindred Substances.

We have taken evidence from the Home Office Divisional Inspectors of Mines, and have obtained a statement from the Department of the Controller of Coal Mines, showing how much cannel coal is being raised, and how it is disposed of; and we have endeavoured to ascertain whether additional supplies of cannel coal could be obtained if and when required.

In the Petroleum Research Department's report and its addendum it is stated that a daily production could be attained of about 12,700 tons of cannel coal or kindred material. The evidence given by the Home Office Divisional Inspectors of Mines, and information supplied by the Controller of the Coal Mines Department show that the present production of cannel coal and kindred substances is in the neighbourhood of 2000 tons a day; and that practically the whole of this amount is sold mixed with other classes of coal or is sent to gas-works for gas-enriching purposes.

With regard to the portion of the cannel coal production which is mined with, and dispatched from, the collieries mixed with ordinary coal, sorting would be necessary in order to render it available for carbonization—a process entailing time and labour. The mines are at present short of labour; and an increased output of cannel coal can only be obtained at the expense of the output of ordinary coal. It is clear, therefore, that if additional supplies are to be obtained to any considerable extent a corresponding increase in labour and plant will be necessary, while no appreciable increase in supplies can be expected for many months. Furthermore, since cannel coal is more difficult to get than ordinary coal on account of its hardness, and in most cases the thinness of the seams, the output of cannel coal per man would be less than the output of coal per man.

With regard to the "jacks" and "batts" referred to in the Petroleum Research Department's report, there are no doubt considerable quantities of these materials lying in mine spoilt-heaps; but, in order to obtain them, additional labour would be required for sorting purposes, while in some cases it would also be necessary to make sinkings, to drive cuttings in the spoil heaps, or to remove the overburden by quarrying, and, in addition, risks from spontaneous combustion and landslips of loose material would have to be taken into consideration.

Labour was certainly available in most of the coal exporting districts during a short period of 1917. But this labour is not available now; and it should be borne in mind that even in 1917, although a certain amount of mining labour was available during a limited period, the urgent demands of the Army and of the Allies might have been expected to cause the withdrawal of labour from cannel coal production at any time.

We consider, therefore, that the amount of cannel coal and kindred substances which could be obtained cannot be said to approach the figure mentioned in the Petroleum Research Department's report.

Collection and Transport of the Raw Material and Method of Retorting.

It is clear from the Petroleum Research Department's report generally that it is intended that batteries of low-temperature retorts should be erected either in the neighbourhood where cannel is or can be mined, or at centres where it can be easily brought together, and the main conclusion of the report is stated therein as follows:

> "It will be seen from the above that it is already possible to advise the erection of ninety-eight* batteries of retorts, each capable of dealing with 100 tons per day. Some of these batterries must be adapted for the treatment of coking material; but in most cases the Chiswick form of retort will be found to meet requirements and to give the best results in gallons per ton and quality of oil produced."

From the evidence placed before the Committee, it is clear that this recommendation was based entirely on the performance of a single experimental retort which, according to the report, had for several months "been in continuous operation night and day under the personal supervision of the staff of the Research Department."

The performance of a single small unit under continual skilled

* This was increased to 127 in the Addendum to the report.

supervision can at best only give a very imperfect idea of the difficulties which would arise in the regular working of plant of a capacity of many thousands of such units by workmen. Many stages have to be passed in the evolution of a really workable industrial unit before it can be safely left in charge of the ordinary works' foremen and labourers. In the report, there is no evidence that this aspect of the proposed scheme was considered; but it is certain that the necessity for this evolution by stages would have seriously delayed the scheme as an immediately productive measure.

If, however, it could have been assumed that this further experimental stage would be quickly and safely passed through, and a thoroughly proved design for the unit of batteries could be produced, the carrying out of a scheme which involved the erection and equipment of 127 (or even 98) batteries of new retorts would have been a most serious undertaking even under pre-war conditions; but at the present time and during the past year or more—when labour, skilled and unskilled, and constructional materials of all kinds have been difficult to obtain for the most urgent war needs—the undertaking would have been well-nigh impossible.

Some idea of the cost of the scheme may be gathered from the expenditure which is being incurred in the erection of a small battery of Chiswick retorts at Nottingham. We are informed that orders have been placed for the erection of a battery to carbonize about 50 tons of cannel per day, at an estimated cost of about £25,000. It would be scarcely fair to calculate the cost of large installations on this basis; but it is evident that if these proposals were carried out, an expenditure of several million pounds sterling would be required.

The following appear to be serious objections to the course suggested:

(*a*) Low temperature carbonization, except in its application in the Scottish shale oil industry, has not yet been proved industrially; and consequently the erection of large units of retorts to carbonize cannel coal and kindred substances could not be justified until success had been demonstrated on a reasonably large scale.

(*b*) A considerable period of time must elapse before the necessary retorts could be completed and brought into operation.

(*c*) A large expenditure of money, labour, and material would be involved in carrying out the scheme, which expenditure would be out of all proportion to the quantity of oil which could be produced.

(*d*) The requirements of coal at home and abroad would not permit the continued diversion of labour for the mining and bringing together of cannel coal for this purpose in sufficiently large quantities to ensure adequate supplies for large units of retorts.

Steps taken by the Ministry of Munitions in Connection with the Petroleum Research Department's Report.

The Petroleum Research Department's report was duly forwarded to the Munitions Mineral Oil Production Department for action. After careful inquiry into the possibilities not only of the method of carbonization advocated in the report, but also of other methods which had been suggested, it was decided that no scheme which required the erection and equipment of entirely new carbonizing works could be entertained.

Inquiries having also been made to ascertain whether cannel coal could be satisfactorily carbonized for oil production in any of the retorts already existing at gas-works, it was found that this method would be practicable if certain modifications in working were introduced, and steps were accordingly taken in that direction. The utilization of existing vertical retorts at gas-works involves only a small expenditure of money, labour, and material; and the system can be, and is being, gradually brought into operation.

A Committee had been appointed in 1917 to investigate the advantages and disadvantages of three types of low-temperature retorts. Comparative tests were made; and the results appeared to be in favour of the form of vertical retort used in the Scottish shale oil industry. It view, however, of the strong representations of the Petroleum Research Department in favour of the installation of the Chiswick type of retort for the carbonization of cannel coal and kindred substances, the Production Department decided to instal a battery of thirty of these retorts at Nottingham; so that practical experience of their working on an industrial scale might be obtained under similar conditions to those prevailing at the Nottingham Gas-Works, where cannel coal is being dealt with in the existing vertical gas-works retorts which have been adapted for the purpose

We consider that this was the right course to adopt in the circumstances, in order that a true comparison on an industrial scale between the two systems of carbonization might be obtained.

The evidence given before the Committee has proved clearly that existing vertical retorts at gas-works can easily be adapted for the carbonization of cannel coal for oil-production, and oil has in fact been produced by this system. A sample of this oil has been tested at the Naval Fuel Depôt at Haslar; and it has been found to be suitable for utilization as fuel for the Navy, if mixed in certain proportions with petroleum taken from stock. Certain physical treatment is necessary; but refining by distillation or chemical treatment is not required.

A sample of the oil produced by the Chiswick form of retort has also been subjected to tests at Haslar, which show that the setting point of mixtures made with this oil is considerably higher than the Admiralty standard.

It is clear that the vertical retorts already existing at the gas-works in the country have sufficient capacity for carbonizing all the cannel coal and kindred substances which can be produced, without grave interference with the output and transport of the present coal supplies; and it is obvious that the small alterations necessary for the adaptation of vertical retorts already existing at many gas-works involve an expenditure of time, labour, and material of quite a different order from that which would be incurred in the construction of entirely new batteries of retorts.

In view of the above facts and of the results which have been obtained with adapted vertical retorts at gas-works, we consider that the Ministry of Munitions were justified in declining to carry out the recommendations contained in the Petroleum Research Department's report.

Bearing in mind, however, the limited quantity of oil which can at best be produced from British cannel oil, we hesitate to recommend, for the following reasons, that the utilization of existing vertical retorts at gas-works should be extended on any large scale until its general economic conditions have proved satisfactory:

(*a*) The output of canneloid materials would have to be considerably increased; and this could only be done under existing conditions at the expense of coal.

(*b*) The coal transport arrangements rendered necessary by the exigencies of the war would be upset if large quantities of cannel coal had to be transported to the proposed carbonizing centres at gas-works, which might be outside the coal transport areas concerned.

(*c*) There would probably be some decrease in the production of town gas, which could be ill-afforded under present conditions.

(*d*) There would certainly be a reduction in the output of coke available for industrial and domestic purposes, as cannel coal and canneloid substances are not satisfactory cooking materials, and in most cases their ash content is very high.

It is clear that a largely increased quantity of oil cannot be obtained by the carbonization of home produced materials during the war, without interfering with other not less important industries. In any event, the national requirements of oil are so large that, even if supplies of cannel coal were multiplied many times over, the amount of oil that could be obtained from this source could only represent a small fraction of the total amount required. It is necessary, therefore, to determine the relative importance of the industries concerned; and we feel that, generally speaking, it is not advisable at present to take further special steps in this direction for oil production beyond those already taken or in preparation.

General.

While the large question of policy as to obtaining or maintaining adequate supplies of fuel oil within the country does not fall within our terms of reference, we have given passing attention to the matter; and apart from the carbonization of canneloid substances, other possible sources of supply appear to be:

(*a*) Boring for oil in Great Britain.

(*b*) Further development of the Scottish shale oil industry.

(*c*) The utilization of dehydrated tar by the employment of suitable solvents.

(*d*) A great extension of the carbonization of raw coal as a preliminary to its use for industrial and domestic purposes. As the greater part of the coal consumed in Great Britain is used in the raw state, there is obviously wide scope in this direction for developments on a really important scale. For every 20 million tons of coal carbonized from 1 to 1¼ million tons of fuel-oil might be obtained. The Fuel Research Board of the Department of Scientific and Industrial Research, is now developing a comprehensive inquiry into the technical and economic possibilities of such a revolution in the preparation and use of fuel for industrial and domestic purposes.

(*e*) The utilization of the extensive deposits of Kimmeridge shale which are known to exist in a belt which crosses England from south-west to north-east. Hitherto no success has attended the numerous efforts which have been made to utilize these shales on any of the well-known lines. It ought not to be lost sight of, however, that these deposits would become an important national asset if their use could be fitted into any wide scheme of carbonization which had for its objects the provision of fuel-oil for the Naval and Air Services and of fuel-gas for industrial purposes.

(*f*) The economic possibilities of the utilization of the extensive peat deposits in the United Kingdom are receiving careful consideration by the Fuel Research Board; and it is understood that a report by a Committee appointed by them in connection with this question is at present under consideration.

Summary of Conclusions.

(1) That the scheme for the carbonization of cannel coal and kindred substances recommended in the Petroleum Research Department's report was not a practicable one, and that the Ministry of Munitions were justified in declining to embark on it.

(2) That the alternative policy of developing the production of fuel-oil from cannel coal and kindred substances in existing vertical retorts at gas-works should be developed within the limits indicated in this report.

(3) That the decision of the Ministry of Munitions to erect a battery of the Chiswick form of retorts was the right course to adopt in the circumstances.

In view of the technical nature of the subject under discussion, Sir George Beilby, F.R.S., the Director of the Fuel Research Board of the Department of Scientific and Industrial Research, was asked and agreed to act as Technical Adviser to the Committee, and attended most of our meetings. We wish to take this opportunity of expressing our appreciation of the valuable advice he has given. We also desire fully to recognize the services of our Secretary, Mr. G. C. Smallwood, whose experience has enabled him to give us valuable assistance both in the conduct of the inquiry and in the preparation of the report.

Appendix.—List of Witnesses.

Sir John Cadman, K.C.M.G., Director of the Petroleum Executive.
Sir Keith W. Price, Member of the Munitions Council.
Sir Arthur Churchman, Bart., Controller of the Munitions Mineral Oil Production Department.
Mr. T. F. Winmill, Technical Adviser to the Munitions Mineral Oil Production Department.
Sir Boverton Redwood, Bart., Director of the Petroleum Research Department.

Mr. Cunningham Craig, Geologist to the Petroleum Research Department.
Mr. William Sutton, M.I.Mech.E., Engineer to the Petroleum Research Department.
Mr. J. A. Greene, Technical Assistant to the Petroleum Research Department.
Mr. John Bond, Engineer of the Southport Gas-Works, late President of the Institution of Gas Engineers.
Dr. H. Colman, D.Sc., Ph.D.
Dr. A. E. Dunstan, D.Sc., F.I.C.
Dr. F. Mollwo Perkin, Ph.D., F.I.C., F.C.S.
Eng.-Com. E. L. Sagar, R.N., Admiralty Experimental Fuel Oil Depôt, Haslar, Portsmouth.
Mr. J. R. R. Wilson, Home Office Divisional Inspector of Mines, Cumberland, Durham, Northumberland, and Cleveland.
Mr. T. H. Mottram, Home Office Divisional Inspector of Mines, Yorkshire and North Midlands.
Mr. A. D. Nicholson, Home Office Divisional Inspector of Mines, Lancashire, Cheshire, and North Wales.
Mr. J. Dyer Lewis, Home Office Divisional Inspector of Mines, South Wales and Monmouthshire.
Mr. W. Saint, Home Office Divisional Inspector of Mines, North Staffordshire, Warwick, South Derby, and Leicestershire.
Mr. H. Walker, Home Office Divisional Inspector of Mines, Scotland.
Mr. J. R. Felton, Home Office Divisional Inspector of Mines, South Staffordshire, Worcestershire, and Somerset.

SOUTH SUBURBAN GAS COMPANY.

Half-Yearly Report and Accounts.

The following report of the Directors (signed by the Chairman, Mr. Charles Hunt), for the half year ended June 30, will be presented at the meeting on Friday.

The net revenue account shows that, including the balance of £2993 brought forward from last half year, and after providing for debenture and other interest, the amount available for dividend is £29,047, out of which the Directors recommend the payment of statutory dividends (less income-tax) as follows: On the 5 p.ct. preference stock, 5 p.ct. per annum; on the 5 p.ct. ordinary stock, 3½ p.ct.; on the 5 p.ct. West Kent ordinary stock, 3½ p.ct.—leaving to be carried forward to next half year the sum of £8510.

Heavy additions to the already high cost of coal and wages necessitated a further advance in the price of gas of 4d. per 1000 c.ft. as from the readings of meters for the Midsummer quarter. The corresponding reduction of dividend under the sliding-scale would be 13s. 4d. p.ct.—to £2 16s. 8d. p.ct.—but for the provisions of the Bill referred to in the succeeding paragraph.

Consequent upon the application by twenty-four companies (including this Company) for temporary modification of the statutory provisions relating to price of gas and dividend owing to war conditions, the whole question was referred to a Select Committee of the House of Commons. The report of this Committee is entirely favourable to the case submitted to them on behalf of the companies; but the measure of relief recommended was wholly inadequate—providing as it did for a minimum dividend of only one-half the standard rate. A Bill, however, to carry this into effect, introduced by the Board of Trade, was amended by the substitution of three-fourths for one-half, according to which the minimum dividend payable by this Company will be 3¾ p.ct.

Early in the year, an Order was issued by the Board of Trade requiring all consumers of gas or electricity to reduce their consumption by one-sixth; but before sufficient time had elapsed to test its effect, it was superseded by a Fuel Rationing Order, which throws almost the whole onus of economy upon the larger consumers, who are the principal users of gas for heating purposes. While this scheme was still under consideration, the Directors felt it to be their duty to draw the attention of the Board of Trade to this inequitable treatment.

The Bill for the acquisition of the Dartford gas undertaking and other purposes has, after considerable delay, made substantial progress in Parliament, and it is hoped will become law during the autumn session.

The accounts accompanying the report show that the total capital expenditure at the close of the half year (including the nominal amount added by conversion) was £1,432,050, or £45,345 more than the receipts—viz., £1,386,705, inclusive of the premium capital. A sum of £7199 was expended on capital account in the half year. The revenue from the sale of gas was £243,171; the rental of meters, stoves, and fittings produced £23,320; sales of residuals, £71,115; and the total receipts were £337,910. The following were the principal items of expenditure: Gas manufacture, £235,160; distribution, £40,364; management, £10,308; rent, rates, and taxes, £11,432; and miscellaneous items bringing up the total to £304,368. Among the last-named items is an amount of £790 charged on account of the co-partnership scheme. The balance carried to the net revenue account amounts to £33,542. and there is available for dividend £29,047.

The statements as to working show that, under the supervision of Mr. S. Y. Shoubridge, the Engineer, 101,705 tons of coal were carbonized and 166,525 gallons of oil used in the half year. The quantity of gas made was 1,524,435,000 c.ft. (347,825,000 c.ft. of oil gas), of which 1,398,848,600 c.ft. were sold and 1,416,165,200 c.ft. accounted for. The residuals made were: Coke, 60,706 tons; breeze, 14,966 tons; tar, 961,993 gallons—the make of sulphate of ammonia being 685 tons.

There has come to hand from the Stanton Ironworks Company, Ltd., near Nottingham, a glass ash or pin tray for office use. On the desk, it will serve as a reminder of "Stanton Cast-Iron Pipes."

LIGHTING OF LONDON.

Experimental Scheme.

Recently the Lambeth Borough Council had under consideration the question of the advisability of putting out of lighting the public lamps in the borough, except in main thoroughfares, during the summer months, with a view of effecting an economy in the consumption of gas. As a result, it was decided to request the Home Office favourably to consider the question of a reduction in street lighting, along the lines indicated. The following communication has now been received from the Commissioner of Police of the Metropolis:

I am directed by the Commissioner of Police of the Metropolis to acquaint you that, with a view to secure further economy in the consumption of coal, the competent authorities have agreed, as an experimental measure, that street lighting in Inner London, as defined in the circular letter of Jan. 29, 1917, may be reduced to the extent of 50 p.ct. of the pre-war lighting, provided that the reduction is spread equally over both main and side streets. It is not desirable that main roads should be easily distinguishable from side streets.

The lighting of street lamps may be commenced later, and the extinction earlier, than at present, provided that the majority of the lamps in the more important streets are in lighting between one hour after sunset, and two hours before sunrise during the summer period. This measure is experimental merely, and must be regarded as subject to revision, partial or general, should it be found that the reduced lighting leads to any increase of crime, or danger to pedestrian and vehicular traffic, or seriously handicaps the effective supervision of the streets by an already depleted Police Force.

In any event the matter would have to be reconsidered at the expiration of summer time. In these circumstances, it is not desirable that any lamps now in lighting should be dismantled.

As special importance is attached by the Military authorities to a uniform lighting effect, it may be necessary to make local alterations in the street lighting and to treat lamps of high power specially. It may also be necessary to require increased lighting in places where the prevailing conditions demand this course.

The Borough Engineer reports that he has been in communication with representatives of the various gas companies concerned, and they are prepared to reduce at once the number of lamps in lighting, and also the lighting hours, as suggested by the Commissioner of Police. It may not, however, be possible, in view of certain necessary exceptions, so to further reduce the number of lamps in lighting as would be equiavlent to a uniform reduction of 50 p.ct. of the pre-war lighting; and in the case of the Gas Light and Coke Company's area, owing to the wide spaces between the lamps and the density of population in that Company's district, it will probably not be advisable to reduce to the extent of (say) more than 30 p.ct. In the cases of the South Metropolitan and South Suburban Gas Companies' areas, every effort will be made to approximate to the 50 p.ct. suggested.

GLASGOW GAS ACCOUNTS.

A Deficit of £68,000.

The Glasgow Corporation Gas Committee have submitted their annual report, which covers the year ended May 31 last.

The gross revenue amounted to £1,621,779, and the gross expenditure to £1,522,444, to which was added depreciation written off capital assets, £23,649; the balance carried to profit and loss account being £75,685. After meeting interest and other charges, there was £143,692 11s. 8d., leaving a deficit on the year's operations of £68,006, which has been met out of surplus revenue account, leaving a balance at the credit of this account of £7583.

The quantity of coal carbonized during the past year was 892,026 tons as compared with 863,087 tons for the preceding year—an increase of 28,929 tons. The average price paid for the coal was 18s. 11·64d. per ton, being an increase of 1s. 2·30d. over the preceding year. The quantity of gas made per ton of coal used was 10,073 c.ft., compared with 9934 c.ft. The gas accounted for during the year amounted to 8,189,904,386 c.ft., against 7,725,877,900 c.ft.—an increase of 464,026,186 c.ft., equal to 6·006 p.ct. The unaccounted-for gas was 8·857 p.ct., as compared with 9·893 p.ct., a decrease of 1·036 p.ct.

HALIFAX CORPORATION GAS DEPARTMENT.

Accounts and Estimates.

The accounts for the year ended March 31 last were presented to the Halifax Corporation Gas Committee at their monthly meeting on the 24th ult.

The average price received for gas over the year was 2s. 5·01d. per 1000 c.ft., as compared with a pre-war average of 2s. 0·20d. After providing for interest, sinking fund, and rents, rates, and taxes, amounting to 12·62d. per 1000 c.ft., there was a deficiency on the year's working equal to 0·32d. per 1000 c.ft.—a satisfactory result, in view of the fact that the estimates accepted at the beginning of the year [February, 1917] showed a deficiency of 2·03d.

When the estimates for the current year (1918-19) were presented in February last, the gas charges were increased to meet the estimated increased expenditure. This brought the estimated average price of gas up to 2s. 10·62d. per 1000 c.ft. The recent increase in the price of coal, and advances in wages under the various awards since February last, representing a total additional expenditure of £21,000 for the year, have necessitated a further revision of prices. As this additional expenditure, which was imposed retrospectively, could not be met by a retrospective advance in gas charges, it was agreed to

advance the rates as from Oct. 1 to March 31 next; and as 1d. per 1000 c.ft. of gas sold over this period produces a revenue of only £2100, it was found necessary to increase the rates for all purposes 10d. per 1000 c.ft., making the estimated average price for the year 3s. 5·16d., compared with a pre-war average of 2s. 0·20d. per 1000—a total increase of 1s. 4·96d.

	Pre-War.	1918-1919.	Increase.
Manufacture, distribution, fixed charges	2s. 4·57d. ..	4s. 5·94d. ..	2s. 1·37d.
Receipts from residual products..	0s. 9·01d. ..	1s. 4·41d. ..	0s. 7·40d.
Net increased expenditure	— ..	— ..	1s. 5·97d.
Total advance in price, including present advance	— ..	— ..	1s. 4·96d.
Increased expenditure the consumer has not been called upon to meet ..	— ..	— ..	0s. 1·01d.

It was mentioned that any decrease in the sale of gas due to the rationing scheme would seriously reduce the estimated revenue. For example, a decrease equal to 5 p.ct. in the amount of gas sold for the year would reduce the revenue by £7350.

WEST BROMWICH GAS ACCOUNTS.

The annual report and statement of accounts of the West Bromwich Corporation gas undertaking has been issued by the Borough Treasurer (Mr. H. Kirk). He states that the total capital expenditure is £259,200, towards which provision for redemption has been made to the extent of £178,805. The total income on revenue account for the year was £89,643—an increase of £9046. Sales of gas amounted to £57,401—an increase of £7166. The principal increases are £2508 on ordinary meter supplies and £4334 for motive power. The quantity of gas sold was 427,704,970 c.ft.—an increase of 28,519,341 c.ft., equal to 7·14 p.ct. During the year the prices of gas had been twice increased. The average price obtained for all gas sold was, less discount, 2s. 8d. per 1000 c.ft. The number of consumers was 12,432. The amount derived from residuals was £28,109—an increase of £768.

The total expenditure was £78,649, or an increase of £11,125. Manufacturing charges were £62,466, an increase of £9110. The net cost of manufacture, after deducting the income from residuals, was 1s. 7·28d. per 1000 c.ft. of gas sold, compared with 1s. 3·64d. the previous year. The total cost, inclusive of all charges, was 2s. 7·39d. per 1000 c.ft. The gross profit was £10,993—a decrease of £2078. The total loan charges were £8594—a reduction of £1467, in consequence of the redemption of the balance of capital outlay on the vertical retorts out of the previous year's surplus. The net profit was £2264—a decrease of £747; and there was a balance of £3375 to be carried forward unappropriated.

Mr. W. H. Johns, the Gas Engineer and Manager, in his annual report, states that, notwithstanding the great difficulties which had to be surmounted, the gas-works and plant had been maintained in a thorough state of efficiency. The quantity of coal carbonized was 35,308 tons, against 33,790 tons. The quantity of coal gas made per ton of coal carbonized was 13,008 c.ft., against 12,257 c.ft. Carburetted water gas was made to the extent of 1,617,000 c.ft., or 9·33 p.ct., against 13,824,000 c.ft., or 3·23 p.ct. the previous year. The summary of working results showed that the cost of coal (including oil) was £40,553, compared with £37,392. Wages at the gas-works amounted to £6195, against £4118. Repairs and maintenance of works, plant, &c., cost £9128, against £7328. The yield of coke and breeze was 22,488 tons, or 12·74 cwt. per ton of coal carbonized, compared with 22,082 tons and 13·07 cwt. the previous year. The yield of tar was 10·93 gallons per ton of coal carbonized, against 11·47 gallons, and of liquor 28·54, against 30·20 gallons; both results being adversely affected owing to the poor quality of the coal. In testing the coal, the amount of inert material found was frequently as much as 25 p.ct. The works were in a favourable position as regarded coal stocks, compared with other undertakings, the stock at the close of the year being 5059 tons, equivalent to about six weeks' maximum consumption. In addition, there were 35,908 gallons of gas oil in reserve.

ACCRINGTON GAS-WORKERS' EXEMPTIONS.

M.A.R.O. Protection Cards and "Trickery."

At the Accrington Tribunal, last Wednesday, the National Service Representative (Mr. T. C. Usher) sought a review of the conditional exemption granted to an employee of the Accrington District Gas and Water Board, stationed at Clayton-le-Moors, who is 42 years of age, and was described at registration as a "general labourer."

The TOWN CLERK (Mr. A. H. Aitken) said the man was a servant of the Gas and Water Board in charge of the conveying plant. He had never been medically examined or graded, and had never been called upon to be graded; and yet he had got his papers. He wondered how it was they did not get these men graded. The man's appeal was on domestic grounds, though the Gas and Water Board could not very well dispense with him.

Mr. USHER said the man had a protection card issued by the Munitions Area Recruiting Officer. Had this not been withdrawn?

A reply was given in the negative.

The CHAIRMAN (Mr. J. Barlow): Nobody outside withdraws that card before he gets notice, so it is still in force. With you bringing up

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his case for review, he thinks you are asking for the withdrawal of the card.

Mr. USHER: I cannot ask for that, I have nothing to do with it.

The TOWN CLERK remarked that the man held a conditional exemption from the Tribunal, and Mr. Usher had served notice for a review of that. He had nothing to do with the M.A.R.O. card.

Mr. USHER: If the protection card has not been withdrawn, then I ask for the withdrawal of the Tribunal certificate.

Colonel SHARPLES (a member of the Tribunal): Is not he a "public utility" man?

Mr. USHER said at present the man held two certificates. He had his M.A.R.O. card, and could do without the Tribunal certificate.

The CHAIRMAN: I think he has a right to hold the certificate, as he is in a certified occupation.

The TOWN CLERK: Men 31 years of age, both married and single, who are in charge of coal-conveyors are exempt.

Col. SHARPLES: If you look at the regulations, you will find, under the head of "Gas-Works," that all classes of workmen inside the works over 41, whether single or married, are in a certified occupation; so he is clearly entitled to his Tribunal certificate. A general labourer must be a workman.

The TOWN CLERK: I contend he is a conveyor man. I do not care two straws about what is said on registration. What a man without instructions has to put his occupation down as in the national registration, has nothing whatever to do with it.

Mr. USHER: Why should a man hold two protections? If he has got it on occupational grounds from the M.A.R.O., why should he hold one from this Tribunal?

The CHAIRMAN: For the reason that he is in a certified occupation. If he were to put himself in the hands of the M.A.R.O., they could simply come to-morrow and take this man, and perhaps others, and probably shut-down half the gas-works. They were very foolish to accept these cards. I would not have done it.

The TOWN CLERK: They were forced upon us.

The CHAIRMAN: I told the management at the time not to accept them.

The TOWN CLERK observed that he recently told the Appeal Tribunal that the whole thing was only a trick, and nothing better than a trick. They foisted these cards upon them *en bloc*, and then withdrew them.

Mr. USHER: Had you no right to refuse them?

The TOWN CLERK: We naturally supposed that they were protected. You cannot shut-up our gas-works.

Mr. USHER: No one is trying to do that.

The TOWN CLERK: But it seems to me you are trying very hard to do so.

The CHAIRMAN: We are at a pinch at the present time. I told them not to accept them, as I could see the trick. There have been a lot of tricks; and this is one of them. If they give a man a M.A.R.O. card, and take it away from him, what is that but a trick?

Mr. USHER reiterated that all he was asking for was that the Tribunal certificate held by the man should be reviewed. The man held two protection cards; and he was asking for the cancellation of one of them.

Col. SHARPLES: Which did he get first?

The TOWN CLERK said the Tribunal card was issued on Sept. 8, 1916, and the M.A.R.O. card in June, 1917.

The CHAIRMAN said the application of the National Service Representative for a review of the exemption would be dismissed.

THE HOUSEHOLD FUEL AND LIGHTING ORDER.

Some Comparative Figures.

In view of the resolutions passed by the conference of local municipalities last Wednesday week in Newcastle-upon-Tyne [*ante*, p. 216], and of the fact that householders will have to make a choice from coal, coke, gas, and electrical energy as fuel, Dr. J. T. Dunn, of Newcastle, has compiled some useful comparative figures as to heating and lighting values. He says:

The total amounts of heat obtainable from the quantities of the various fuels specified by the Order as equivalent, may be put roughly as follows:

Coal, 1 ton	7,500,000	calories
Coke, 1½ tons	9,750,000	,,
Gas, 15,000 c.ft.	1,875,000	,,
Electrical energy, 800 B.T.U. . . .	1,875,000	,,

A calorie being the amount of heat needed to raise a kilogram of water through 1° C. of temperature.

There seems here an enormous discrepancy; but it must be remembered that in no case do we actually utilize these total quantities of heat, and that we use gas or electricity much more efficiently—*i.e.*, with much less waste—than coal or coke. But the figures show that the efficiency (the proportion of the total obtainable heat that we actually utilize) will have to be in the case of gas four times, and in that of electric energy eleven times, as great as in the case of coal, if the allowances of these are to be really equivalent to the specified amount of coal. Coke seems to have an advantage over coal; but while for heating a room by radiation in an ordinary household grate it is probably more efficient than coal, it is much less so in heating the oven or the boiler by flues from the ordinary kitchen fire. The relative cost of these "equivalent" quantities, if prices be: Coal 32s. per ton, coke 25s., gas 3s. per 1000 c.ft., and electric power 1½d. per unit, will be represented by the figures 32, 37½, 45, and 100 respectively.

If we carbonize 15 tons of coal in a gas-works, we get in its place, available as fuel (say) 180,000 c.ft. of gas and 7½ tons of coke. On the basis of the Order, the gas is equivalent to 12 tons of coal, and the coke to 5 tons. So that by the process we have increased our 15 tons of coal to 17 tons; and we have all the tar and other bye-products as

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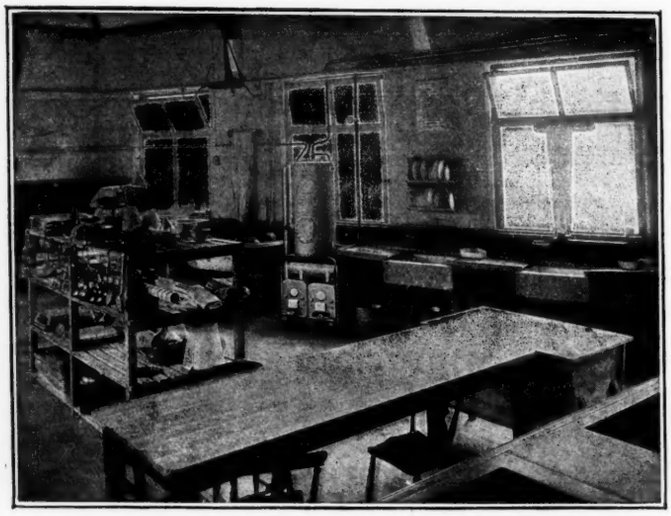

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well. Were this really the case, the Order should clearly have compelled people to take all their fuel as gas and coke, in the proportions of 24,000 c.ft. of gas to every ton of coke, and thus augment the coal resources of the country. We have not really such a widow's cruse in the gas-works; but if we look at the actual calories, we find that of the 7,500,000 in a ton of coal, we get 1,500,000 in the gas and 3,250,000 in the coke. If we assume that the efficiency of our gas heating is even as low as twice that of our coal heating (so that 1,500,000 calories in the gas is equivalent to 3,000,000 from coal) we get back 6,250,000 calories out of our 7,500,000, or five out of every six. Thus at the sacrifice of only one-sixth of the heating value of the coal, we get the bye-products which coal yields on distillation. As these bye-products include the benzene, toluene, and phenol or carbolic acid from which high explosives are made, the reasonableness of the request of the conference that the gas allowance should be increased is apparent.

The lighting allowance seems rather to favour the gas consumer. Now, 7500 c.ft. of gas burned with incandescent mantles at 20 candles per c.ft. per hour would give 150,000 candle-hours—*i.e.*, the equivalent of one standard candle burning for 150,000 hours—while 120 B.T.U. of electric energy in lamps using 1·2 watts per candle power would give 100,000 candle-hours. But there is so much variation in the efficiency of individual lamps and burners in different consumers' houses, that perhaps the allowances are more nearly equivalent than they seem. Whether or no, users of one or the other will do well to calculate roughly beforehand, on these bases, what amount of light their allowances will give them. Thus, four 25-candle lamps will be kept going for 1000 hours, or (say) three hours a day all the year round, by 120 B.T.U., or three incandescent burners using 2½ c.ft. per hour each would be supplied for the same time by 7500 c.ft. of gas.

The operation of the Order will everywhere compel very stringent restriction of consumption. But unless the second request of the conference is acceded to, we in the North will be very heavily penalized as compared with the South (or with those parts of the country west of the Pennines). My last five years' consumption, converting all the gas (I cannot distinguish between that used for heating and that for lighting) and coke into coal, on the basis of the Order, works out at 16 tons per annum. But the house which in London is to be allowed 12 tons is in Newcastle to be allowed, not 16, but 13 tons. My 16 tons is to be cut down to 9 tons; and the winter cold will be embittered by the knowledge that my "equivalent" in London is only cut down from 12 to 8 tons—that while I am shorn of 7 tons, he loses only 4 tons. Further, if we even grant that a ton extra in the North is enough in the case of a six-roomed house (it is not so, on the above showing), a ton for a twelve-roomed house must be insufficient.

Let us hope, not only that the date of the Order's coming into force may be postponed, as the conference suggested, but that the interval may be occupied in removing some of its more glaring inequalities. The cheerfulness and goodwill with which people submit to burdens and restrictions is enormously greater when they can feel that the burdens are fairly distributed, and fall equally on all.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Aug.* 2.

At the present time pitch is the only product in which special interest is taken. There is a fair demand for home trade, and for export numerous inquiries are in the market. The price is firm, at round about 57s. 6d. net per ton f.o.b. makers' works. Toluene, benzene, naphthas, creosote, &c., continue under official control. Carbolic acid, 60's, remains at 2s. 6d. net per gallon, in bulk, at producers' works. There is no change in sulphate of ammonia; the home trade remaining regulated by official licence, and at fixed prices.

Tar Products in the Provinces.

Aug. 3.

The average values for gas-works products during the week were: Gas-works coal tar, 27s. to 31s. Pitch, East Coast, 25s. to 30s. per ton; West Coast—Manchester 25s. to 30s., Liverpool 25s. to 30s., Clyde 25s. to 30s. nominal. Benzol 90 p.ct., London, 11½d.; North, 10½d. to 11½d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, London, 8d. to 8½d.; North, 7¾d. to 8¼d. Solvent naphtha, naked, London, 3s. 5d. to 3s. 6d.; North, 3s. 3d. to 3s. 4d. Heavy naphtha, London, 3s. to 3s. 1d.; North, 2s. 11d. to 3s. 1d. Creosote, in bulk, London 4¼d.; North, 4d. to 4¼d. Heavy oils, in bulk, North, 4¼d. to 5d. Carbolic acid, 60 p.ct. East and West Coasts, 2s. 6d. to 2s. 9d. naked, nominal. Naphthalene salts, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per unit; "B" quality, 1½d. to 2d.

FROM A MARKET CORRESPONDENT.

Tar Products.

Conditions have not changed materially during the week, and business has been of somewhat smaller dimensions in view of the holidays. Pitch still continues to find its way from the Provinces to London, where the shipping position is relatively good. Prices in London are 55s. to 57s. 6d. per ton, and Provincial rates continue to harden, although there is a tendency to go carefully, in view of the possibility that the movement of pitch towards London by rail may be restricted. Creosote, carbolic acid, toluol, and benzol are in great demand for official purposes. Considerable criticism has been levelled lately at the low official quotations for the two last-named. Both benzol and toluol cost more than double their official selling prices to produce; and producers are losing money heavily—so far without any thought of compensation on the part of the Government—as the reward for patriotic service undertaken entirely in the national interest. This applies more

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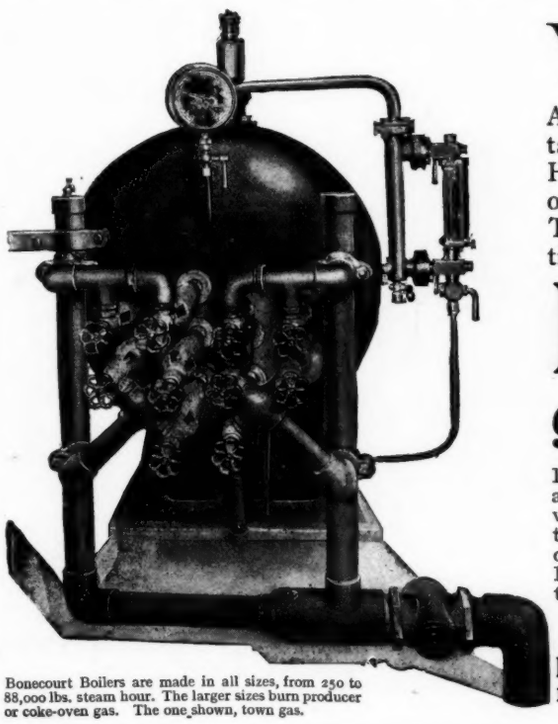

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particularly to the gas industry, which is very heavily hit by the many bye-product restriction orders, and coal regulations. Trade in solvent and heavy naphthas is still confined to small lots; and prices are without any appreciable change. Crude naphthalene is firm, and is rapidly absorbed at from £6 per ton and upwards according to quality; refined is not much mentioned, but makes about the old prices. Cresylic acid is in request. Anthracene is firm; and not much change has taken place in aniline oil. The range of quotations is as under:

Benzol: 90% London, 1s. 0½d., North 10½d. to 11½d.; 50% North 1s. 4d. to 1s. 5d. naked per gallon.

Carbolic Acid: 60% East and West Coast 3s. 6d. per gallon; crystals 40% 1s. 3d. per lb.

Crude Tar: London 32s. 6d. to 35s.; Midlands 27s. to 29s.; North 28s. to 30s. per ton, *ex* works.

Pitch: London 52s. to 55s. f.o.b. works; East Coast, 33s. f.o.b.; West Coast, 31s. f.a.s.; Manchester, 30s.; Clyde 29s.; South Wales 42s.

Solvent Naphtha: Naked London 90-190% 4s. 6d.; North 3s. 9d. to 4s. per gallon; 90-160% naked London 4s. 3d. to 4s. 6d.; North 4s. to 4s. 3d. per gallon.

Crude Naphtha: Naked 30% 8½d. to 8¾d.; North 6½d. to 6¾d.

Naphthalene: Refined £30 to £32 10s.; salts 80s., bags included.

Toluol: Naked, London 2s. 4d.; North 2s. 3d.

Creosote: Nominal, London 4¼d.; North 4d. to 4¼d. (Government price, 75s. per ton f.o.b.—equal to 4⅛d. per gallon); heavy oil, 4¼d. per gallon in bulk.

Anthracene: "A" quality, 40-45%, 4½d. per unit; "B" quality, 1⅞d. to 2¼d.

Cresylic Acid: 95%, 3s. per gallon; 97-99%, 3s. 3d. to 3s. 6d. per gallon, casks included *ex* works London and f.o.b. other ports.

Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Sulphate of Ammonia.

There is little fresh news regarding this product. Conditions, as regards home trade, remain fairly good—in fact, better than seemed likely in the early part of the year; but there is still much heart-burning over the loss of export trade and the advent of the synthetic product; and it is hoped that some official pronouncement regarding the future may soon be made.

Since the above report was received, and too late to refer the matter to our correspondent, the following letter came to hand from Messrs. Thomas Horrocks and Sons, Ltd., of Manchester.

Sir,—Referring to the "Journal" of July 30, we notice that the "Market Correspondent" has the price of carbolic acid 60's, east and west coasts, 3s. 6d. per gallon. There is evidently some mistake in this—the price being 2s. 6d., *ex* makers' works. We should be glad if you would draw your correspondent's attention to this before it is again published, as some contracts are based on prices given by the "Journal." After the Government withdrew their standard figure, there was considerable reduction in the market and the price obtainable to-day is 2s. 6d. per gallon for 60's.

Profit at Oswaldtwistle.

Mr. T. C. Usher (the Chairman of the Oswaldtwistle Gas Committee), at the last meeting of the Council, said that for the financial year ended March 31 the expenditure amounted to £13,351, and the income to £17,194, leaving a gross profit of £3843, and a net profit of £1327. Good results in manufacture had been the chief cause of the year's prosperity, as the high figure of 13,428 c.ft. of gas per ton of coal carbonized had been obtained—beating the previous record of 12,648 c.ft. per ton. He was sure the Council would appreciate the results obtained, which reflected distinct credit upon Mr. J. H. Davies (the Engineer and Manager) and his staff. So far, during the war the Gas Committee had been able to meet the whole of their liabilities without unduly burdening the gas consumer, as was shown by the average price which the department had received from consumers during the last five years—viz., in 1913-14, 2s. 3·16d. per 1000 c.ft.; in 1915-16, 2s. 3·86d.; in 1916-17, 2s. 7·8d.; and in 1917-18, 2s. 9·47d. He desired to compliment Mr. Davies upon the success of the undertaking. Where Mr. Davies shone exceedingly was in the ability he displayed on the commercial side of the undertaking. Mr. Davies was one of the keenest buyers he had ever come in contact with; and the township should be highly pleased that they had such a capable man at the head of the gas-works. Mr. Hargreaves (a former Chairman of the Committee), joining in the congratulations to Mr. Davies, said when he was first appointed Chairman the make was only a little over 9000 c.ft. per ton of coal carbonized; and in those days they had the pick of the coal, whereas to-day the Engineer had to get coal where he could, and accept any quality sent him. These facts showed what a wonderful transformation had been effected by Mr. Davies. He was persuaded that the best policy the Committee could adopt was to leave the Manager a comparatively free hand as regards management, while retaining to themselves the direction of general policy. The Gas Committee had worked on these lines; and the results had justified the confidence they had reposed in Mr. Davies.

Too Much Gas Used at Blackpool.—At the monthly meeting of the Blackpool Gas Committee, it was reported that in the preceding four weeks there was a net total increase in the consumption of over 3 million c.ft., or 5·8 p.ct. more than last year. The night consumption was down 5·5 p.ct.; but the day consumption, owing to the great use of gas for cooking, was 39¼ million c.ft., against 35¼ millions last year, an increase of 11·6 p.ct. The department are in something of a quandary. They are only receiving 800 tons of coal a week, and consuming 1300 tons. In August, the weekly consumption will go up to fully 1500 tons. Fortunately, there is enough coal to see the season through; but it is quite probable that afterwards there will have to be enforced rationing—*i.e.*, the supply will be cut off during certain hours every day. Visits have been paid to the Coal Controller's Department in London, and to the Lancashire Coal Supplies Committee at Wigan, in an endeavour to secure larger supplies; but these efforts have been unavailing.

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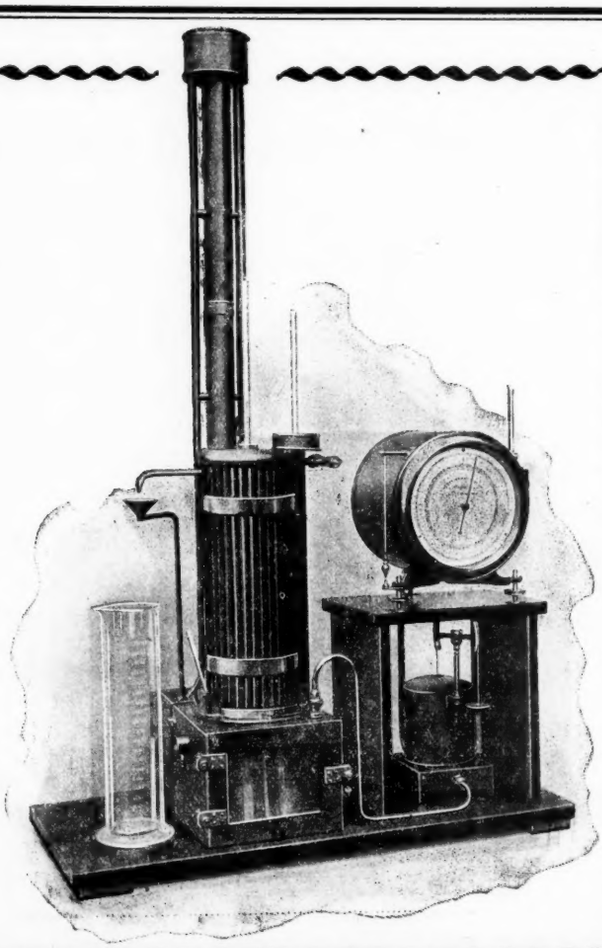

A "Dangerous Precedent" at Derby.

In connection with a report of the Markets Committee to last week's meeting of the Derby Town Council, that they recently agreed to join the Association of Local Authorities Not Owning Gas Undertakings (who were laying before the late Select Committee on "financial hardships" the views of such bodies), Mr. J. Ferguson Bell, the Engineer and Manager of the Derby Gas Company, asked the Chairman whether the consent of the Council was obtained before the Committee incurred costs in parliamentary opposition to certain Bills by public utility companies. Alderman Johnson (the Deputy-Chairman) said the consent of the Council was not obtained before the Committee agreed to join the Association. The costs were not expected to exceed £50, the limit which the Committee were authorized to expend without sanction. The Association embraced 45 towns; and but for the action taken, the interests of provincial gas consumers would not have been represented at all before the Select Committee. The Council passed without comment at their meeting on June 5 an account for the costs. Alderman Hart strongly protested against the Committee joining the Association in the name of the Corporation, without the Council's knowledge. The expenses in connection with the matter were passed two months ago, without a word being said as to the Corporation being members of the Association. Mr. Prince expressed considerable surprise at the Committee's action, and said he thought a very dangerous precedent was being set. The report was ultimately adopted.

Costs and Charges at Barrow.—The Barrow Town Council, meeting on Monday of last week, passed a resolution that the price of gas supplied by ordinary meter be increased to 4s. 6d. per 1000 c.ft., as from the date of taking the next reading, and by prepayment meter to 4s. 11d., as from Sept. 1. Alderman Neal (the Chairman of the Gas and Water Committee) pointed out that, though the selling price of gas had increased from 2s. 6d. in 1914 to 4s. 6d. per 1000 c.ft., equal to 80 p.ct., coal had increased in price 83 p.ct., wages 86 p.ct., and oil 450 p.ct. In a list of a number of other towns, it was shown that coal was much cheaper than at Barrow—averaging £1 6s. per ton, against £1 13s. 2d. at Barrow. Councillor A. Brown (the Vice-Chairman of the Committee) said when the last increase in the price of gas was made, it was expected that they would be covered to the end of 1918-19. They had, however, to get coal for one works from Northumberland, which took longer to carbonize than the former Yorkshire coal; and therefore the works produced less gas in a given time. At the other works they were allowed Yorkshire coal; but there they had had a difficulty in not getting enough. The extra cost of coal, owing to the recent advances, would be £7400 per annum; and wages were up another £4000 a year—making £11,400. They expected to get £1500 more from coke; and the further 6d. per 1000 c.ft. on the gas would bring in £10,250. There was some criticism; but the Council eventually endorsed the recommendation.

Increases in the Price of Gas.—The Bolton Gas Committee have increased the price 4d. per 1000 c.ft. to ordinary consumers, and 10d. to industrial users. The Colne Corporation have decided to increase the price of gas to 3s. 9d. in the borough and to 4s. outside. This advance of 6d. per 1000 c.ft. comes into force in September. The Hawick Gas Light Company have provisionally fixed the price of gas at 4s. 4d. per 1000 c.ft., an increase of 4d. The Ilkeston Gas Committee have determined that, as from Oct. 1, the price of gas and all meter and cooker rents be increased by 20 p.ct.

Gas Prices at Plymouth.—In proposing at the meeting of the Plymouth Town Council yesterday week that the price of gas in the Devonport area be increased from 3s. 2d. to 3s. 4d. per 1000 c.ft., Alderman Tozer (the Chairman of the Gas Committee) said that, after they made the estimates for the year, the price of coal was advanced 4s. per ton. This meant an addition of £9277 to the cost of producing gas, besides which increases of wages amounting to £5683 had to be met. The Committee were satisfied that by the small increase now proposed in the cost of gas, together with the surplus from last year and the improved value of residuals, they would be able to meet this additional expense. He had been asked why the municipal gas undertaking advanced the price of gas while a private company serving the other part of the borough were not increasing their price. The explanation was that the capital of the two undertakings was raised on different terms. If the Corporation undertaking were worked on the same basis as a private company, where the whole capital remained floating, the price would be 4d. per 1000 c.ft. less than it was. Last year they paid off no less than £9300; and each year they had to find a similar sum for the redemption of capital.

Birmingham's Big Electricity Supply Extension Scheme.—The Birmingham City Council gave their sanction at the last meeting to a big extension scheme in connection with electricity supply. The matter is, of course, of considerable interest to the gas industry, though it has been pointed out at the Council meetings, when the suggestion has been made of rivalry between the gas and electricity departments, that each has its own legitimate and well-defined field for action and development. The new scheme provides for the building of a permanent generating station at Nechells, for mains and substation equipment, and for the provision of a linking-up main between the station and the Smethwick boundary, at a cost of £1,626,140. The amount of interest and sinking fund is £130,000; and the estimated units for sale will be 133 millions. The capital of the existing works is £1,972,132; the interest and sinking fund £171,962; and the units for sale 160 millions. The work was commenced, but war broke out; and the Government declined to allow them to proceed. Alderman Jephcott stated that the Government had conceded the principle of financial assistance to the Corporation on the following basis: To pay the difference between the cost of proceeding with the scheme at present abnormal prices and the cost at post-war prices (date to be agreed).

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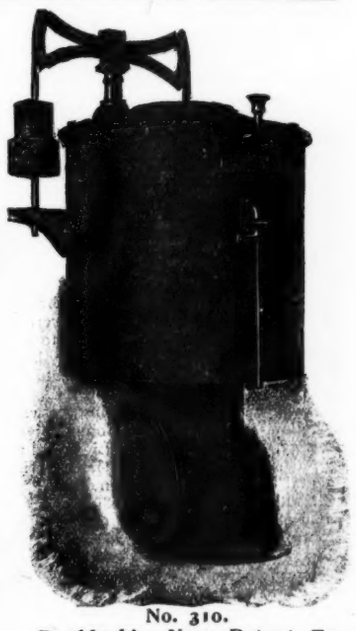

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Negro Women in Atlanta Gas-Works.—Negro women have taken the place of male labourers to a large extent at the Thurmond Street plant of the Atlanta Gas Light Company (Ga.); and they are said to be giving thoroughly satisfactory service. The women do all the rough work formerly done by men, and stand up under it well. They wear men's overalls and rubber boots; and the average visitor, it is declared, would not know they were women by a casual glance.

War Wages at Bradford.—When the proposed increases of war bonus to Bradford Corporation employees [*ante*, p. 219], providing a lower increase for women than for men, came before the City Council on Tuesday last, the War Wages Committee asked permission to withdraw for further consideration the part of the minutes relating to the women. They said it was desired that the various Committees concerned should confer. The matter was allowed to be withdrawn. In discussion on the remainder of the recommendation, objection was taken to the phrase "able-bodied men" as being the persons entitled to the increase; it being held that this would injure returned soldiers. It was explained that these men were not affected, as it was expected that the Government would be responsible for men hurt in the war, and they should not be entirely a charge on the local ratepayers. The Council had given guarantees to employees joining the forces; and these would be observed. The minutes were approved.

Gas Charges at Birmingham.—At a meeting of the Birmingham City Council last Wednesday, the Gas Committee were authorized to alter the price of gas by public notice, should this be found necessary (between now and the October meeting), to cover the additional cost of materials. The Council accepted without comment the recommendation, which was made "in view of the constantly increasing prices of all raw materials—particularly coal—and the short notice usually given by the Government of such increases."

Explosion at the Leighton Buzzard Gas-Works.—Following upon an explosion late on Monday night of last week, the central portion of the offices at the Leighton Buzzard Gas-Works was found to be burning fiercely. The cause of the explosion is somewhat of a mystery; and it can only be surmised that there was a leakage in the meter-house beneath the office. The fine oak-panelled Board-room above the meter-house was practically blown away. The front and back walls collapsed; and a portion of the side wall fell through the roof of the general office. Fortunately, the governor-house next to the Board-room was not damaged. Had this portion of the works been destroyed, the gas supply of the district would have been interrupted for days, instead of hours. As it was, Mr. H. G. Ruggles (the Manager) and the staff worked through the night to get the damaged plant restored; and the supply of gas was resumed on Tuesday evening.

STOCK MARKET REPORT.

Business on the Stock Exchange last week pursued the even tenor of its way for the most part—exempt from the agitating influence of factors of high excitement. The lull in the activities of the Western front, and the calm confidence engendered by the position attained by the Allied Forces at the close of the last half of the month of July, tended to produce a period of quiet firmness in pretty well all departments which were not subjected to circumstances affecting them specially and prejudicially.

The gilt-edged market continued in high favour. Home Government issues were very firm. War Loans and Consols improved their positions almost daily—undismayed by the public patronage extended to Bonds. Home Rails, too, were in excellent case; dividend announcements affording satisfaction. Canadians were rather irregular; and Argentines were subject to fluctuations.

The Foreign Market was quieter, but could show some good points. A noteworthy feature was the support accorded to Russians. Egyptian, Brazilian, and Honduras issues were in request; and Greek was favourably noticed. In Miscellaneous, Rubber did fairly well, and Oil very well. Other strong lines were Breweries, and Iron and Steel concerns; but Shipping was checked by realizations.

Business in the Gas Market was fairly bright and active, though not equal to the volume of the week before. The tone generally was favourable, and several advances occurred throughout the list. In Gas Light and Coke issues there was a slight reaction owing to realizations, which were no more than to be expected after the very considerable rise in their prices the previous week. However, they were quoted *ex div.* on Wednesday at not much below ordinary adjustment figures. South Metropolitan and Commercial were steady. Lea Bridge quotation was put up to a level at which recent bargains have actually been done. European advanced to 9½-10½ *ex div.* Ottoman also rose.

Bargains done for cash during the week were as follows: On Monday, Commercial debentures 53, European 9¾, Gas Light ordinary 66, 66½, 67, ditto maximum 53½, Imperial Continental 86½, 87, 87½, 88, San Paulo debenture 41. South Metropolitan 67, 68¾, 69, South Suburban 68, Tottenham "B" 65. On Tuesday, Brentford "B" 66, Commercial 4 p.ct. 60, ditto 3½ p.ct. 55, Gas Light ordinary 65½, 66, ditto preference 69, 69¼, Imperial Continental 87, 87½, 88, Primitiva 27s. 6d., 28s., ditto preference 51s., South Metropolitan 67¼, 67½, 67¾, South Suburban (West Kent) 61. On Wednesday, Bombay 5 5/16, Cape Town debenture 60, Continental Union 30, European 9 11/16, 9¾, *ex div.*, Gas Light ordinary 64 *ex div.*, ditto maximum 51¾ *ex div.*, ditto preference 67½, 67¾ *ex div.*, ditto debenture 56, Imperial Continental 87, 87¼, 87½, ditto debenture 67¼, Primitiva preference 52s. 3d., South Metropolitan 66½, 67, 68, ditto debenture 54¼. On Thursday, Continental Union 32, Gas Light ordinary 67½, 67¾, Imperial Continental 87¾, Primitiva 27s. 6d., 28s. 9d., ditto preference 52s., South Metropolitan 67, ditto debenture 54¾, Wolverhampton 10 p.ct. 150.

In the Money Market, conditions were irregular, rates varying from ease to firmness. The Bank rate is 5 p.ct. as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share.	When Last Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
189,049	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref. .	..	55—60	..
1,551,868	,,	April 8	2½	4⅜%	Alliance & Dublin Ord.	59—64	50—55	..
374,000	,,	July 10	4	4%	Do. 4 p.c. Deb.	76—79	57—62	
280,000	5	April 29	7½	8%	Bombay, Ltd.	5⅞—6⅛	5—5⅛	5 5/16
50,000	10	Feb. 26	16	13⅓%	Bourne- (10 p.c.	29—30	21—28	..
888,110	10	,,	7	7%	mouth Gas (B 7 p.c.	15—15½	10½—11	..
115,000	10	,,	6	6/-	and Water (Pref. 6 p.c.	13½—14	9—9½	..
159,740	—	—	—	4%	(4 p.c. Deb.	..	66—68	..
992,045	Stk.	Feb. 26	14	14%	Brentford A Consolid. .	261—266	73—76	
734,930	,,	,,	11	11%	Do. B New . .	204—209	65—68	66—67
55,000	,,	,,	5	5%	Do. 5 p.c. Pref. .	109—111	77—82	..
221,400	,,	June 11	4	4%	Do. 4 p.c. Deb. .	91—93	62—64	..
217,880	,,	Feb. 26	11	9%	Brighton & Hove Orig. .	208—213	135—140	..
244,200	,,	,,	8	6%	Do. A Ord. Stk.	154—159	95—100	..
580,000	20	Mar. 26	12½	22/6	British	44—45	30—31	..
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk..	88—90	64—66	..
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	60—63	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½—2½	3/2—4½	..
100,000	10	—	—	4½%	Do. 4½ p.c. Pref. . .	4—6	7—8	
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	60
221,400	,,	June 11	4	4%	Chester 5 p.c. Ord. . .	108—110	79—81	
217,880	,,	Feb. 26	11	9%	Commercial 4 p.c. Stk. .	106—108	57—62	60
1,513,280	,,	Feb. 12	5/9/4	41/4	Do. 3½ p.c. do. .	103—105	54—59	55
580,000	,,	,,	5½	36/8	Do. 3 p.c. Deb. Stk.	69½—71½	51—53	52½—53
475,000	,,	June 11	8	8%	Continental Union Ltd.	76—79	30—35	30—32
800,000	,,	,,	4	—	Do. 7 p.c. Pref.	115—118	55—60	..
200,000	,,	,,	7	—	Croydon B and C 7 p.c..	..	150—160	..
278,400	—	—	—	11⅛%	Do. E	..	..	..
—	—	—	—	10%	Derby Con. Stk. . . .	123—125	95—100	..
492,270	Stk.	—	6	6⅔%	Do. Deb. Stk. .	102—104	80—83	
55,000	,,	—	4	4%	European, Ltd. . . .	17½—18	9½—10½*	9 11/16—9 3/4
1,002,180	10	July 29	10	5/0	Gas (4 p.c. Ord. . .	98—102	63—65*	63—67
16,298,975	Stk.	Feb. 10	4/17/4	29/4	Light (3½ p.c. max. .	76—79	51—53*	51 3/4—53 1/2
2,600,000	,,	,,	8½	8½%	and (4 p.c. Con. Pref.	96—99	66—68*	67½—69¼
4,062,285	,,	,,	4	4%	Coke (3 p.c. Con. Deb.	..	..	56
4,674,850	,,	June 11	8	8%	(10 p.c. Bonds .	..	..	..
130,000	,,	,,	10	10%	Hastings & St. L. 3½ p.c.	87—89	46—51	..
258,740	,,	Mar. 12	5	3⅓%	Hongkong & China, Ltd.	16½—16¾	7—8	..
70,000	10	April 29	11	6%	Hornsey 7 p.c.. . . .	..	115—125	..
86,600	—	—	—	9⅓%	Ilford A and C. . . .	151—154	90—95	..
181,000	Stk.	Mar. 12	7½	7%	Do. B	115—118	70—75	..
65,780	,,	,,	6⅔	6⅔%	Do. 4 p.c. Deb. . . .	92—94	62—65	..
65,500	,,	June 26	4	4%	Imperial Continental .	150—160	86—88	86⅔—88
4,840,000	,,	May 14	9	4½%	Do. 3½ p.c. Deb. Red.	84—86	66—68	67½
1,935,000	,,	Feb. 12	3½	3½%	Lea Bridge Ord. 5 p.c. .	119—121	92—97	..
285,942	,,	Mar. 12	6½	6½%	Liverpool 5 p.c. Ord. (A	211—213	89—84	..
2,498,905	,,	Feb. 26	10	5%	Liverpool 5 p.c. Ord. (B	146—148		
806,088	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	71—78	..
75,000	5	June 11	6	2/-	Malta & Mediterranean	4½—4⅝	3⅜—3⅞	..
250,000	100	April 1	4½	4½%	Met. of (4½ p.c. Deb.	99—101	88—99	..
541,990	20	May 26	4	6/-	Melbourne (4½ p.c. Deb.			
1,875,892	Stk.	July 29	4½	3 11/16%	Monte Video, Ltd. . .	11½—12	8⅜—9½	..
539,705	,,	June 26	8½	8½%	Newcastle&Gatsh'dCon.	98½—99½	69—71	..
55,940	10	Feb. 26	7/14/0	7/-	Do. 3½ p.c. Deb.	83—88	59—61	..
300,000	Stk.	May 14	8	8%	North Middlesex 7 p.c. .	14—15	9½—10½	..
60,000	5	Mar. 26	10	1/-	Oriental, Ltd.	117—122	101—108	..
60,000	50	Feb. 26	18	10%	Ottoman, Ltd.	7½—7⅞	3—4	..
100,000	50	,,	12	9%	Portsea, Island B . . .	128—131	80—85	..
53,000	50	,,	10	7%	Do. C . . .	118—121	75—80	..
249,980	5	April 29	8	—	Do. D . . .	..	..	..
499,960	5	June 26	5	2/6	Primitiva Ord.	5½—6	1⅜—1⅝	27/6—28/9
521,600	100	June 2	4	4%	Do. 5 p.c. Pref. .	4⅜—5	2½—2⅝	51/—52/6
—	—	—	—	4%	Do. 4 p.c. Deb. .	91—93	75—77	..
846,198	Stk.	June 26	4	4%	Do. ,, ,, 1911	..	53—53*	..
150,000	10	May 14	6	6/-	River Plate 4 p.c. Deb. .	85—87	55—60	..
125,000	50	July 1	5	5%	San Paulo (6 p.c. Pref..	10½—11	7½—7⅞	..
135,000	Stk.	Mar. 12	10	10%	(5 p.c. Deb..	47—49	40—42	41
209,984	,,	,,	10	10%	Sheffield A	223—224		..
623,500	,,	,,	10	10%	Do. B	223—224	174—177	..
90,000	10	May 28	9	6/-	Do. C	220—222		..
6,609,895	Stk.	Feb. 10	5/4/0	40/-	South African.	10½—11½	10—11	..
—	—	—	—	—	South Met. 4 p.c. Ord. .	111—113	68—70	66½—69
1,895,445	,,	July 10	8	8%	Do. Pref.	..	91—93	..
224,820	,,	Feb. 26	8½	6%	Do. 3 p.c. Deb. .	72½—74½	53—55	54½—54⅔
952,795	,,	,,	6	4⅛%	South Shields Con. Stk.	157—159	121—123	..
60,000	,,	,,	5	5%	S'th Suburb'n Ord. 5 p.c.	114—116	68—71	68
135,000	—	—	—	4⅛%	Do. 5 p.c. Pref. . .	110—112	73—75	..
187,558	Stk.	June 26	5	5%	Do. West Kent . .	..	..	61
647,740	,,	May 14	5	3%	Do. 5 p.c. Deb. Stk.	116—118	82—84	..
120,000	,,	Feb. 12	7½	5⅓%	Southampton Ord. . . .	99—102	74—76	..
782,275	,,	,,	6	4%	Tottenham (A 5 p.c. .	135—138	90—95	..
181,255	,,	June 26	4	4%	District (B 3½ p.c.	115—117	65—67	65
182,880	10	Dec. 30	5	—	(4 p.c. Deb.	87—89	61—63	..
149,900	10	July 1	5	5%	Tuscan, Ltd.	5—6	1—2	..
236,476	Stk.	Mar. 12	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
					Tynemouth 5 p.c. max..	103½—109½	87—88	..
30,000	,,	Feb. 26	8⅔	67/6	Wandsworth, Wimbledon, and Epsom—			
255,636	,,	,,	6⅔	52/6	Wandsworth A 5 p.c..	151—156	90—95	..
108,075	,,	,,	5/17/3	47/3	Do. B 3½ p.c. .	129—134	70—75	..
859,000	,,	,,	6½	46/3	Do. C 3½ p.c. .	110—115	70—75	..
98,000	,,	,,	6⅔	52/6	Wimbledon 5 p.c. . .	117—122	70—75	..
88,416	,,	June 26	3	3%	Epsom 5 p.c. . . .	121—126	70—75	..
					3 p.c. Deb. Stk.	66—69	48—51	

* Ex Div.

Blue Water Gas at Oldham.—At the last meeting of the Oldham Gas Committee, Mr. Tim Duxbury (the Gas Engineer) reported that, at a conference of gas engineers in London, the different gas undertakings were asked to save the coal consumption as much as possible by manufacturing water gas. An attempt would be made to let every gas-works have six weeks' supply of coal by the end of October. During the year ended March last, 111 million c.ft. of blue water gas was made at the Oldham works, and over 9000 tons of coal saved.

The Lockerbie Town Council have decided to increase the wages of their employees 5s. per week; the condition being that the men should sign an agreement to remain for six months.

Sanction has been refused by the Ministry of Munitions to a proposal by the Annan Gas Company to erect a new holder and steel tank. The project is therefore delayed until after the war.

The Chelmsford Corporation Gas Committee are paying an account amounting to £48 submitted by the Fire Brigade Committee for the use of the fire-engine for pumping water required for testing the new gasholder, and for hose destroyed during the pumping, which had to be replaced. The steamer was for eighteen days working practically continuously day and night. The cost of labour amounted to £11; and most of the remainder of the account is for replacement of hose.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

ENGINEER AND MANAGER. Richmond Gas Company.
ENGINEER. Weymouth Gas Company. Aug. 23.
ASSISTANT MANAGER. Grays Gas Company.
ASSISTANT MANAGER. Burnley Corporation. Aug. 26.
SHOWROOM MANAGER AND COLLECTOR. Braintree and Bocking Gas Company.
SUPERINTENDENT. Coventry Corporation. Aug. 24.
CARBONIZING FOREMAN. Chesterfield.

Appointments, &c., Vacant (*Continued*).

ASSISTANT TO SECRETARY. Luton Water Company. Applications by Aug. 17.
RETORT-HOUSE FOREMAN. No. 6480.
DRAUGHTSMAN. No. 6476.
JUNIOR ASSISTANT CHEMIST. No. 6479.
RETORT-HOUSE HANDS. Aldershot Gas Company.

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Meeting.

BARNET DISTRICT GAS AND WATER COMPANY. Aug. 26, 12.30 o'clock.

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ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every Description of GAS APPARATUS, ELEVATING, CONVEYING, and TELPHERAGE PLANTS, also STOKING MACHINERY, Ross Mount Ironworks, Elland.

BRITISH GAS PURIFYING MATERIAL.

ENGLISH BOG ORE AND NATURAL HYDRATED OXIDE OF IRON.
SPENT OXIDE BOUGHT.

BRITISH GAS PURIFYING MATERIALS CO., LTD.
(W. T. P. CUNNINGHAM, Chief Proprietor and Managing Director.)
13, Arcadian Gardens, Wood Green, London, N. 22.
Telegrams: "Bripurimat, Wood, London."
'Phone: Palmer's Green 608.

SULPHURIC ACID.

SPECIALLY prepared for the manufacture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD.,
with which is amalgamated Wm. Pearce & Sons, Ltd.
Mark Lane, London, E.C. Works—Silvertown.
Telegrams—"Hydrochloric, Fen, London."
Telephone—1588 Avenue (3 lines).

ALDER AND MACKAY, LTD.
(Established 1850.)
WET AND DRY METERS,
SLOT AND ORDINARY.
STREET LAMPS AND AUTOMATIC CONTROLLERS.
EDINBURGH.
(See p. 274.)

JAMES MILNE & SON, LTD.,
(Established 1750.)
SLOT AND ORDINARY DRY METERS,
EXTENSIVE RANGE OF USEFUL GAS WORKS' ACCESSORIES.
EDINBURGH, GLASGOW, and LEEDS.

HUTCHINSON BROTHERS, Ltd.,
Falcon Works, Barnsley,
Manufacturers of
GAS METERS (Ordinary and Prepayment),
"FALCON" INVERTED LAMPS and SQUARE LANTERNS for Street Lighting,
INVERTED BURNERS and CONVERSION SETS for Street Lamps.
ENQUIRIES SOLICITED.

FOR Gas-Works Plant of Every Description; also SULPHATE OF AMMONIA and SULPHUR RECOVERY PLANTS,
C. & W. WALKER, LIMITED,
DONNINGTON, NEWPORT, SALOP.

"FERROX." "FERROX." "FERROX."
A BRITISH Oxide Cheaper and Better than Bogore. 35 per cent. Water, 75 per cent. Ferric Hydrate. For Sale outright or on Loan.
OXIDE LIMITED, Brentford, Middlesex.

SPENCER'S Patent Inclined HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide Lightly.
See Illustrated Advertisement, May 28, p. 363.

J. E. C. LORD, Ship Canal Tar-Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia, &c.

JOHN RILEY & SONS, Limited, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 60 years. Reference given to Gas Companies.

GAS-WORKS requiring Extensions should Communicate with FIRTH BLAKELEY, SONS, AND CO., LIMITED, Dewsbury, who make a Speciality of Catering for the Smaller Gas Concerns. Prices Reasonable; quality and results, the best. Satisfaction Guaranteed.

IRISH ASSOCIATION of GAS MANAGERS.

President:
H. KIRKHAM, New Ross.

THE
ANNUAL MEETING
OF THE ASSOCIATION
WILL BE HELD IN THE
COUNCIL CHAMBERS, CITY HALL, DUBLIN,
ON TUESDAY, AUG. 13, 1918.

The Chair will be taken at 11 a.m. by the PRESIDENT.

Business: Reception by the Lord Mayor of Dublin; President's Address; Report of Committee, with Abstract of Accounts and Auditor's Report; Report of District Representative; Election of Scrutineers; Election of District Representative on Council of Institution of Gas Engineers; Discussion on Increasing the Annual Subscription of Members of this Association to 10s. 6d.; Increase of the Affiliation Fee to the Institution of Gas Engineers, introduced by Mr. A. S. Brook, Lisburn; Next Place of Meeting.

Papers to be Read.

(1) "Methane Hydrogen Gas at Birr," by Mr. R. Young.

(2) "Random Thoughts," by Mr. T. J. Reid, Ballina.

The members and their lady friends will, on the kind invitation of the President, have light refreshments in the Dolphin Hotel, about 1 p.m.

The usual Dinner of the Association will take place at 6 p.m., at the Dolphin Hotel, Essex Street. Members are requested to apply at once for tickets, as the number must be guaranteed by Aug. 9. Tickets 4s. 6d. each.

Members are requested to bring their own sugar.

Application for Dinner Tickets must be made to the Hon. Sec. not later than Aug. 8, after which no ticket will be issued.

On Wednesday, Aug. 14, an Excursion for members and lady friends has been arranged as follows: Members and friends to meet at Bank of Ireland (College Green), at 10.30 a.m., and will proceed by drags to Lucan, via Phœnix Park, Main Road to Knockmaroon Gate, then down the hill to North Bank of the Liffey by Strawberry Beds, and along the River to the Spa Hotel, Lucan, where Dinner will be served at 12.30 p.m. A beautiful piece of the Lucan Estate affords a delightful walk to the famous Salmon Leap, and on returning to the Hotel, Tea will be served about 4 p.m. The return journey will be made in time to reach the City by 6 p.m. Price of Tickets, including Drive, Dinner, and Tea, Fees, and Gratuities, 8s. 6d. each. Seats will be booked according to the numbers on Tickets. No application can possibly be entertained after Aug. 8.

G. Airth,
Hon. Secretary and Treasurer.
Gas-Works, Dundalk.

CORRESPONDENCE TUITION in GAS ENGINEERING for City and Guilds Institute Exams. (Preliminary and Final). Successful Results. Low Fees.
Pennington's Engineering Tutors, 254, Oxford Road, Manchester.

WEYMOUTH CONSUMERS' GAS COMPANY.

REQUIRED, by the above Company, an efficient ENGINEER and MANAGER, having a good Practical Experience of Gas Manufacture and Distribution, and of the Manufacture of Sulphate of Ammonia. A knowledge of Water-Gas and Benzol Plant is desirable. Annual make of gas, 170 millions.

Applications, stating Qualifications, Experience, Age, and Salary required, accompanied by *copies* of not more than Three Testimonials, to be sent to the Chairman of the Company, No. 71, St. Thomas Street, Weymouth, on or before the 23rd inst.

E. Y. Wood,
Secretary.
Weymouth,
Aug. 2, 1918.

ENGINEER and Manager required for the Richmond (Surrey) Gas Company. Make, about 400 Millions.

Applicants must have a large Experience of Gas Manufacture and Distribution, the Designing and Erection of Plant, and a Practical Knowledge of Chemistry. Liberal Terms to a Competent Man.

Applications, stating Age, Qualifications, and References, to be addressed to the Chairman, Gas Offices, The Green, Richmond, Surrey.

*** This is a revised form of the advertisement that appeared July 23—No. 6477.

COVENTRY CORPORATION.
(Gas Department.)

APPLICATIONS are invited for the Position of SUPERINTENDENT of the Foleshill Gas-Works, Coventry.

Salary, £350 per Annum.

Applications, stating Age, and giving full Particulars of Training and Experience, together with Three recent Testimonials, to be addressed to the Chairman of the Gas Committee, and sent in not later than Aug. 24, 1918.

P. N. Langford,
Engineer and Manager.
Gas Offices,
Coventry.

WANTED—Junior Assistant Chemist for Tar Works Laboratory to do Eight Hours Shift Work, in Metropolitan Area.

Apply, by letter, to No. 6479, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

DRAUGHTSMAN Wanted for Con- trolled Firm of Constructional Engineers in Birmingham.

Apply, by letter, stating Age, Salary required, and full Particulars, to No. 6476, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

BRAINTREE AND BOCKING GAS COMPANY, LIMITED.

SHOW-ROOM Manager and Collector required at once—Appointment for the Duration of the War. Applicants to be Free from Military Obligations.

Send full Particulars of Qualifications and *copies* of recent Testimonials, stating Salary required, and when Free, to the undersigned.

Wm. Surman,
Engineer and Manager.
Gas-Works,
Braintree.

COUNTY BOROUGH OF BURNLEY.
(Gas Department).

ASSISTANT Manager wanted. Com- mencing salary £300 per annum.

Applications, giving full particulars of age, education, mechanical and technical training and references, to be sent to the Gas Engineer, Gas-Works, Burnley, endorsed "Assistant Manager," not later than Monday, the 26th of August next.

Peregrine Thomas,
Town Clerk.
Town Hall,
Burnley,
Aug. 1, 1918.

THE Directors of the Grays and Til- bury Gas Company require the Services of an ASSISTANT MANAGER (for the Duration of the War). Only Fully Qualified Men need apply. Vertical Retort Experience an Advantage.

Salary, £200 per Annum, with House, Gas, and Fuel provided.

Applications and Testimonials to be sent to Mr. Arthur W. Sumner, Engineer and Manager, Gas-Works, Grays, Essex.

THE Luton Water Company, Beds., need an ASSISTANT to the SECRETARY of the Company. Applicant to be a thorough Accountant and, if possible, had Experience in routine of a Water Undertaking.

Applications, stating Age and Salary required, with not more than Three Testimonials, to be sent not later than Aug. 17, 1918.

J. G. Meadows,
Secretary.

WANTED—Good Carbonizing Fore- man, accustomed to Regenerative Furnaces, Sulphate Making, and General Gas-Works Routine. Wages, £3 10s. per Week.

Apply, stating Age, Experience, &c., with *copies* of One or Two recent Testimonials, to Mr. W. T. Buckland, Engineer, Gas-Works, Chesterfield.

RETORT-HOUSE FOREMAN required by a Gas-Works in the South of England producing over 800,000,000 C.Ft. per Annum. A good wage will be paid; but only those who are Thoroughly Experienced in Retort-House Work, and whose services can be spared from their present Employment, need apply.

Applications, stating Age and Experience, to be sent as soon as possible to No. 6480, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

ALDERSHOT GAS, WATER, AND DISTRICT LIGHTING COMPANY.
(Ash Road Works.)

OWING to the calling-up of men for Military Service, additional CARBURETTED WATER GAS OPERATORS, BOILERMEN, RETORT HOUSE HANDS, and LABOURERS are required immediately.

Apply to Mr. D. Ritchie, the Manager.

PURE WHITE SULPHATE OF AMMONIA.

FREE Acid reduced almost to vanish- ing point by a special process easily installed and no extra working costs. Patent applied for.

Arrangement can be made at once for the application of the process.

The only payment is that of a small annual fee.

All particulars from No. 6478, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

SPENT OXIDE.

REQUIRED about 250 Tons of Fused Rock-Hard SPENT OXIDE—50 p.ct. Sulphur—for Cyanide Purposes.

State Lowest Price for Immediate Delivery to the Engineer, City Gas-Works, Windsor Street, Birmingham.

CROMER GAS COMPANY.

WANTED—Two Second-Hand Boiler SHELLS or Cast Iron Covered TANKS for Oil Storage. Capacity, 1500 Gallons.

State Price on Gas Siding (M. & G.N. Railways), Cromer, and Particulars to the Engineer.

AMMONIA Plant Complete for Imme- diate Delivery, GASOMETER, FILTERS, Cast and Wrought Iron TANKS and RECEIVERS, PIPING, VALVES, GIRDERS, Babcock and Wilcox BOILER and WATER SOFTENING PLANT.
Richard Sizer, Ltd., 82, Mark Lane, E.C. 3.